THE IRON AGE

THURSDAY, DECEMBER 25, 1902

The Cuban Reciprocity Treaty.

The new reciprocity treaty between the United States and Cuba, now pending in the Senate, which was negotiated at Havana by Gen. Tasker H. Bliss and the Cuban Secretary of the Treasury, provides for a reciprocal reduction of 20 per cent. in the rates of duty on merchandise of one country imported into the other. On a great variety of staple articles Cuba grants 25, 30 and 40 per cent. reduction. American, Porto Rican and Philippine tobaccos, however, are expressly barred from the benefits of the reduced tariff. The ratifications of the treaty are to be exchanged at Washiugton before January 31 next, and go into effect ten days after the exchange, continuing for five years, unless after the first year Cuba finds its concessions excessive under the new tariff law which the republic is to enact. In this case it is provided that negotiations may be reopened with a view to securing modifications of its terms.

After five years the treaty can be terminated, after 12 months' notice, by either republic. In case of tariff changes by either country which work to disadvantage of the other, only six months' notice is necessary to abrogate the treaty, whether within the five-year limit or thereafter.

On the following articles from the United States a reduction of 25 per cent. is made on importation into Cuba, omitting those in which our readers are not specially interested:

Cast iron, wrought iron and steel and its manufactures; machinery and apparatus of which copper is the component of chief value; ships and water borne vessels of all kinds, of iron or steel.

A reduction of 30 per cent. is granted on the following:

All articles of cutlery; gold and silver plated wares.

The object of the treaty, it is stated, is to strengthen the bonds of friendship between the two countries and to facilitate their commercial intercourse by improving the trade between them.

Boiler Explosion at the Packing Plant of Swift & Co., Chicago.

A disastrous boiler explosion occurred November 29 at the packing plant of Swift & Co., Chicago, in which 14 lives were lost and many persons seriously injured. Not only have the city officials and others in authority been seeking the cause for the accident, but it is understood that officials of the Master Steam Boiler Makers' Association have been making personal investigation and that the subject will be taken up by a special committee of the association at the next monthly meeting. T. C. Best and Bernard Solinsky, president and secretary respectively of the association, have taken much interest in discovering the cause of and responsibility for the catastrophe. The illustrations which are herewith presented were taken for *Motive Power*, the official paper of the Master Steam Boiler Makers' Association.

BOILER EXPLOSION AT THE PACKING PLANT OF SWIFT & CO., CHICAGO.

The boiler house was a one-story building located on Forty-first street, midway between Ashland avenue and Laflin street. Immediately opposite the boiler house on Forty-first street were low sheds used as car shops. Adjoining the boiler house on the west was a two-story structure used as a warehouse. The engine room and refrigerator plant were separated from the boiler house by a court stretching south to Forty-second street.

The boilers were arranged in two batteries, five on the north and five on the south side of the building. In one corner was another boiler of much larger size, and still another generator was separated from the others

by a partition. It was the center boiler of the north battery which exploded.

According to the information brought out at the investigation each of the ten boilers weighed about 10 tons and was of 80 horse-power. They were installed about two years ago, but were reconstructed during the early part of this year. At the inspection made by city authorities in June the boilers are said to have been tested to 188 pounds pressure. Representatives of insurance companies who had also tested the batteries were present at the inquiry. The inspection of the insurance companies is said to have been about two months ago. The separate boilers were of 250 and 400 horse-power each.

The following statement concerning the effect of the explosion is given by *Motive Power:* "The entire top was blown completely off the boiler and the flues were scattered in every direction. One of the tubes was completely collapsed from end to end. One peculiar feature about the explosion was that the top of the boiler did not give way at the seams, as is the usual occurrence, but

Fig. 2.—The Wrecked Boiler.

BOILER EXPLOSION AT THE PACKING PLANT OF SWIFT & CO., CHICAGO.

tore through the solid plate. [This is shown in Fig. 2.] This fact proved that the boiler was well made."

"The horizontal seams were double riveted, the boiler was riveted by hand. When the boiler exploded it raised up and sheared all the rivets in one center round about seam of the long steam drum, which extended over the entire battery of boilers and threw one-half of the drum about 100 feet to the east and the other half about the same distance to the west. All the force of the explosion struck this latter half, which went through the west end of the roof of the building and next came in contact with the walls of the storehouse to the west. The brick structure toppled with the force of the collision. The drum carried away 50 feet of the wall and then rose through the roof of the storehouse about 30 feet in the air and dropped back again. The west wall obstructed the way, but the impact scattered the bricks and beams in every direction, and the drum shot out across an open space and buried itself in the earth." It is reported that the wrecked plant will be rebuilt at once.

A meeting of the National Association of Emery and Braser Wheel Manufacturers of America was held at the Iroquois Hotel, Buffalo, on December 16. It is understood representatives of 17 companies engaged in the manufacture of abrasive wheels were present. The stated object of the gathering was to agree upon a plan and schedule of prices which would increase the profits, while also lessening the cost of production. It was decided to hold another meeting in Niagara Falls six months hence, at which time it is hoped to make further progress with the plan.

Steel Rails in Canada.

The "Soo" Steel Mills.

TORONTO, CANADA, December 20, 1902.—Naturally much interest has been excited here by the closing down of some of the works of the Consolidated Lake Superior Company, the cancelling of the last dividend resolution, the resignation of the president and the break in the company's stocks. A considerable number of people in Toronto had made speculative or investment purchases of the stock, but apart from any personal stake in the enterprises of the company there is the public commitment. Mr. Clergue is looked upon as a great pioneer in the work of developing the resources of a region that was a wilderness when he entered upon it. With remarkable courage and energy he overcame difficulties which Canadians might not have grappled with for 20 or 30 years. He has laid the lines and put down the foundations of a very extensive system of transportation, colonization and manufactures. It would be a serious thing for the country tributary to Sault Ste. Marie and for Ontario if the work he has pushed so far should stop. It would be a blow to the Provincial Government, which has given him very large concessions of lands, some of it heavily timbered, some of it supposed to be richly mineralized and some of it fit for agriculture. Of course the Government and its supporters, who are numerous enough to elect more than half the members of the Legislature, are anxious to have the Clergue undertakings succeed. One of the reasons submitted by the Government why it should be returned in the last election was that it had through its arrangements with Mr. Clergue and his colleagues brought about wonderful developments in New Ontario.

Temiskaming Rail Contract.

Being thus closely identified with his projects in Northwestern Ontario the Government would feel bound to do anything reasonably to be expected of it to see them through. Mr. Clergue had stated that one great difficulty to the continuous operating of his rail mill was the lack of tariff protection. His efforts to induce the Dominion Government to put a duty on rails were not successful. Shortly after his return from Ottawa the steel plant was closed down. It was not possible, he said, to meet the prices at which German sellers laid down rails here. When the break in the company's stocks came the Ontario Government brought forward a measure of relief. The Government is building a line of railway from North Bay, on the main line of the Canadian Pacific Railroad, into the Temiskaming country. The commission in charge of the construction made public the following statement on the 13th:

It has been decided by the commission, with the approval of the Government, to award the contract for the rails for the first 60 miles of the Temiskaming & Northern Ontario Railway and 5 miles of sidings to the Algoma Steel Company, subject to the execution of a satisfactory contract form, the terms of which will be 8200 tons, 80 pounds to the yard, which is the style of rail now adopted as the standard by the leading railways on the continent. The price is $32 per ton of 2240 pounds, f.o.b. cars, North Bay; and the deliveries called for are one-third May 15, one-third June 15, and one-third July 15, 1903.

Tenders for the rail requirements of the Temiskaming Railway were called for from A. G. Kidson & Co. of Glasgow, Scotland: Maclure, Limited, Toronto; the United States Steel Corporation, the Illinois Steel Company, the Dominion Iron & Steel Company, Gerald Lomer, Montreal (representing German manufacturers), M. & L. Samuel, Benjamin & Co., Toronto; Jas. Cooper, Montreal (representing Charles Cammell & Co. of Sheffield, England), and the Algoma Steel Company.

No replies were received from Kidson & Co., Glasgow, Scotland, and Maclure, Limited, Toronto. The United States Steel Corporation intimated that they would not be in a position to quote, as did also the Illinois Steel Company of Chicago and the Dominion Iron & Steel Company of Sydney, C. B.

In calling for tenders the commission required that the price quoted should be duty paid, f.o.b. cars at North Bay, as it felt that the foreign manufacturers of rails should assume the risk of the imposition of an import duty on steel rails at the approaching session of Parliament. The lowest tender received was from Mr. Lomer of Montreal, representing German manufacturers, but his price was not duty free, his quotation being on the understanding that should a duty be imposed the commission should pay it. James Cooper of Montreal, representing

Charles Cammell & Co., was the next lowest tenderer, but his quotation was on the same basis as Mr. Lomer's. M. & L. Samuel, Benjamin & Co. of Toronto were the next lowest tenderers, they agreeing to guarantee no duty if the commission would give them the option of delivery before the dates specified. It will therefore be seen that should the Dominion Government at the approaching session of Parliament think it proper to give the steel rail manufacturing industry protection, approximating in extent that already afforded to other steel and iron manufacturers—viz., $7 per ton, the price at which the contract was awarded to the Canadian manufacturers is well within the figure at which steel rails may be imported if such a duty be imposed.

The commission took the view that as a question of public policy was involved in placing the order, it would be proper to submit the matter to the Government to ascertain whether it would be fully in accord with the disposition of the commission to award the contract to the company operating within the province. This was done, and the reply received from the Government was that it would cordially approve of the contract being awarded to the Algoma Steel Company.

So the Ontario Government pays the Sault company a price that yields several dollars a ton at present market quotations, but if a duty is imposed before delivery the price may be within that at which the rails could be laid down from outside.

No Help from Dominion Government.

A contract for 25,000 tons of rails has just been awarded by the Dominion Government. The question of a duty being on or off at the time of delivery would not have to be calculated for in the tenders, for whether rails are dutiable or on the free list at that time they must come in free for the Dominion Government. No favors were shown to Canadian steel works. The Government went into the open market and bought at the lowest price. English, German and Belgian firms tendered and the contract was given to an English company.

The Sault company have a standing contract to deliver 25,000 tons per annum to the Government. For the first year the price was to be $32 and for subsequent years that ruling in the British market. It appears that only 3500 tons have been delivered by the Sault company on the current year's contract and for that reason the Government decided to go into the open market. Nothing has been said about the quality of the rails delivered, nor have the Canadian Northern Railway Company, who have taken to buying abroad after receiving some Sault rails, anything to say on that point.

No Rails from Sydney.

It was decided at a meeting of the Executive Committee of the Dominion Iron & Steel Company at Montreal on the 18th inst. not to continue the construction of the steel rail mill for the present, but to turn the building to the purpose of manufacturing structural steel. It is held that there is a much larger Canadian market for the latter than for steel rails. Had there been a fair market here for rails the rail mill would probably have been finished some time ago, but the steel rail industry being unprotected in Canada and the market for pig iron and steel billets in the United States being exceptionally profitable for the trade in these raw materials, the company were in no hurry to complete their rail plant. Now they have concluded not to go on with the plant at all, but to turn to the making of structural shapes. Machinery for the manufacture of these is being bought in Germany and the works are expected to be ready for operation by May 1.

Evidently there is little reason for expecting a duty to be placed on steel rails at the next session of Parliament. Mr. Clergue must have felt that the outlook for such a tariff change was not bright after his interview with the Government or he would hardly have given out the gloomy statements that he made public as to the causes of his closing down. And now comes the announcement that the Dominion Company will abandon the rail project, for which they had their capital stock increased. That company must be pretty well satisfied that there is no protection on rails forthcoming.

Curiosity is expressed as to the form in which the Dominion Government will assist the construction of the transcontinental line which is to be built by the Grand Trunk Pacific Railway Company. Will a land subsidy be given similar to that given to the Canadian Pacific Railroad? Strong opposition to such a method has already been signified by the Premier of Manitoba. A cash subsidy for so long a line is out of the question. A bond guarantee is a possibility. Another possibility is that the Government will assure the company the free importation of rails. If such an understanding has been reached the reason for not meeting the wishes of the steel rail makers here is obvious.

Two years ago the Dominion Government made it plain that it did not consider a duty the best way in which to aid the rail industry. It declined to impose a duty and gave a premium on a price at which it contracted to take rails from Mr. Clergue's company.

C. A. C. J.

Michigan Manufacturers' Association.

Michigan cities were well represented on December 17 at a meeting of the Michigan Manufacturers' Association held in Detroit. The association is in its infancy, having been organized only last June at Lansing, and this was its first annual meeting. The principal action taken in trade matters was the decision to appoint what is to be called an Advisory Committee, which will, in turn, appoint subadvisory committees to have jurisdiction in all matters of trade interest in every Senatorial district of the State. The appointment of the main committee will be left to the president. These advisory committees will look into all matters of importance in each district and discuss them with a view to satisfactory legislation.

George H. Barbour, the retiring president, in his address advised the encouragement of the Michigan Manufacturers' Association by all manufacturers in the State, and advocated it as a means of settling all trade difficulties. Especially in the question of strikes, or if difficulties should arise between the manufacturers themselves, he recommended that the association be called on to remedy the trouble by arbitration. This, he said, could be accomplished with ease, as it was the natural way of settlement of serious difficulties. He proposed in such event that the trouble be submitted to the secretary by both sides. In 'urn, the secretary would make it known to the Board of Directors and a committee would be appointed to settle matters. This is the only proper way, he thinks, to keep the horizon clear.

Mr. Barbour emphasized the value of Michigan as a manufacturing center, showing in what lines the State stands at the head in manufactured articles, mentioning particularly stoves and furniture. Unsatisfactory conditions may come up when least expected, and for this reason he thought that general support should be given the association. In addition, he urged that the manufacturers join the national organization, and that greater attention be paid to the export trade by the individual manufacturer. In this way better results in trade relations could be obtained.

The officers elected for the coming year were as follows: President, George E. Bardeen, president of the Bardeen Paper Company, Otsego; first vice-president, William Barnhart, president of the Nelson-Matter Furniture Company, Grand Rapids; second vice-president, J. Henry Dort of the Dort Carriage Company, Flint. The position of secretary and treasurer will be filled later by the directors. This is a double office, and will, without doubt, be given to the present incumbent, J. J. Handshue of Lansing.

The *Schweizerische Bauzeitung* reports an examination recently made into the condition of a Parsons steam turbine of 600 horse-power, supplied some time ago to the Tschöpelner Braun Kohlen-und Tonwerke by Brown Boveri & Co. of Baden. The motor had never been opened since its receipt and had at the time of examination run for a total of 7000 hours, which is equivalent to over two years' work at the rate of ten hours per working day. A thorough investigation into the condition of the buckets, brasses and journals was made. Not the least signs of wear were anywhere discoverable, so that the turbine was simply closed up again and set to work without any adjustment or repair.

Central Pennsylvania News.

HARRISBURG, PA., December 20, 1902.—Three of the largest departments of the Pennsylvania Steel Company, at Steelton, have been closed on account of inability to secure coal and iron. There is no relief in sight and no prospect of resumption until the Monday following Christmas, at the earliest. The blast furnaces are making fair outputs, as there is a "from hand to mouth" supply of coke on hand and considerable ore. The furnaces were all banked during several days of the week. So busy are the mills of those departments not affected by the fuel and material scarcity that there will be no shut down on Christmas. It was the plan of the officials to work all departments on Christmas Day, in order to catch up with back orders, but inability to secure fuel has thwarted this plan. Car shortage, the officials say, is wholly responsible for the present situation. Empty cars are also hard to secure and shipments were short this week, so much so, indeed, that iron that should be out of the yards this time will hardly be moved before the new year.

The Chesapeake Nail Works of Harrisburg are also closed on account of the fuel famine and will not resume until after Christmas. The Central Iron Works, the Harrisburg Foundry & Machine Works, the Lalance & Grosjean tin plant, the Harrisburg Pipe & Pipe Bending Works and the Harrisburg Boiler & Mfg. Company are all working with fair supplies of fuel on hand, but will suspend for one day, December 25. The largest local transaction of the week was the order of the Pipe & Pipe Bending Works for 2160 plates from the Central Iron & Steel Company, to be delivered immediately.

The Carbondale Machine Company of Carbondale have been awarded the contract for equipping the new cold storage house of the Scranton Refrigerating Company, at Scranton.

Plans and specifications for what will be the largest freight car plant in the world have been completed by the draftsmen of the Delaware, Lackawanna & Western Railroad Company. The plant will be located along the Kersey Valley branch in West Scranton. The estimated cost of the plant ready for operation is $550,000.

The Keystone Furnace, at Reading, which was banked for repairs, was put in blast on Monday and is again in full operation. The stack is making foundry iron at present and is turning out about 1000 tons a week.

The employees of the Climax Locomotive Works, at Corry, were on Monday notified of an advance of 10 per cent. in their wages, the raise to take effect immediately.

S. P. & H. H. Light of Lebanon expect to begin operating one mill of their new iron plant at Hebron on January 1. Employment will be given to 110 men, and as the other mills are started the working force will be increased. It is expected that the entire plant will be in operation by February.

The Vulcan Iron Company of Scranton are enlarging their plant. The buildings of the company already cover several acres, but business has been growing so rapidly that a new molding department has become an imperative necessity. The annex will be of brick, 200 feet wide by 500 feet in length. It will be used for molding department and machine shop, the old machine shop being too small to meet present needs. The enlargement will allow the company to extend several branches of the industry to which little attention has heretofore been paid.

Work was suspended at the Lebanon Stove Works this week as a result of the roof of the flask department collapsing under a heavy weight of snow and ice. The machinery was somewhat damaged.

The Dauphin County Court this week declared null and void the charters as corporations of the Chickies Iron Company of Lancaster and the Conewago Iron Company of Dauphin County. Counsel for both companies was in court and stated that he had no objections to make to the rule. Neither of the companies is actively engaged in business.

At the annual meeting of the West End Rolling Mill Company & Chain Works of Lebanon the following officers were re-elected for the year 1903: C. Shenk, president; J. R. Evans, secretary; H. M. Capp, treasurer and general manager. The annual report showed the company to be in a flourishing condition. The usual 3 per cent. dividend was declared and an "extra" of 22 per cent.

The Emmert Mfg. Company of Waynesboro this week shipped a large consignment of pattern makers' tools to England and Canada. The factory is working full time on rush orders.

Large orders for traction engines and saw mills were this week received by the Geiser Mfg. Company of Waynesboro.

Lack of fuel caused a shut down of the works of the Floyd-Wells Stove Company, at Phœnixville, for several days this week.

Shortage of coal has cut the production of the Duncannon Iron Company, at Duncannon, almost in half this week. The outlook at present is anything but bright. S.

Another Niagara Power Project.

The application of the Toronto Niagara Power Company for a franchise privilege to develop 100,000 horsepower in Queen Victoria Free Park, on the Canadian side at Niagara Falls, has opened anew the discussion in regard to the extent of the development at Canadian Niagara. On the evening of Friday, December 19, a hearing on the application was held in the Parliament buildings, in Toronto, on which occasion the Government was represented by Premier Ross and Gibson, Stratton, Harcourt and Dryden.

Among those who appeared as interested in the prospective action of the Government on the application were representatives of the Toronto Niagara Power Company, the petitioning company, the Canadian Niagara Power Company, the Ontario Power Company and the Niagara Falls Park & River Railway Company. The subject was presented in the form of a report from the Park Commission, which advocated the granting of the petition of the Toronto Niagara Power Company, and it would appear from this report that the new company contemplate a development on lines very similar to those of the Canadian Niagara Power Company, which is by means of a wheel pit and tunnel tail race. The report expressed the opinion of the commissioners that the granting of the privilege would not interfere with the rights of any of the present companies, and in this contention they were supported by the opinion of J. J. R. Croes, who held that the contemplated work of the company would not divert the flow of the river away from the intake of the Canadian Niagara Power Company, nor would the taking of 11,200 cubic feet of water per second from the river appreciably lower its level.

Inasmuch as the Ontario Power Company contemplate establishing their forebay and intake far above the point where the Toronto Niagara Power Company seek to tap the river that company were not much interested in opposing the grant. However, the Canadian Niagara Power Company representatives recognized in the contemplated grant serious menace and danger to the great works they are now erecting in Victoria Park and on which they are expending millions of dollars. The question hinged on whether or not the inlet works of the Toronto Niagara Power Company would or would not affect the water level and water supply of the Canadian Niagara Power Company. One side contended that it would, while the other side was equally positive it would not. In order to illustrate how reasonable was their contention the Canadian Niagara Power Company pointed out the remarkable effect of the wing dam erected by the Ontario Power Company, which has had the effect of diverting the entire flow of that portion of the river from about the Dufferin Islands.

The general offices of the Virginia Iron, Coal & Coke Company will be moved on January 1 from Bristol, Tenn., to Radford, Va.

The Tynan Annealer and Rivet Heating Forge.

Many uses will be found for the Tynan annealer and forge in repair and regular ship work, and also in particular classes of work in boiler, copper and plate shops, steel car work, bridge building and the like. This device has shown its efficiency in railroad repair shops for straightening bent sills and sides of pressed steel cars, straightening damaged steel body and truck bolsters, arch bars, truss rods, &c. The entire outfit is of a strictly portable character, so that it can be used in any desired position or location.

The first engraving shows the annealer applied for annealing the armor plate of a battle ship to receive the armor door hinges. The general arrangement of the parts is illustrated in the drawing, Fig. 2. The oil supply tank may be carried upon a small truck or placed near the work, as shown in Fig. 1. The air pressure is taken from a general or special pneumatic plant, and is allowed to pass through an air pressure reducing device, thus serving the precise amount of air required for economical combustion. Regulating devices are also used for controlling the supply of air and oil at the combustion nozzle. When a pneumatic pressure service is not convenient a small hand pump will serve the purpose equally as well, an auxiliary air receiver of suitable size being the only detail required to form a portable air power plant.

The burner can be directed at any point, and the localizer or concentrator, which is composed of a special mixture of nonradiating material, while allowing the flame to be concentrated on the part to be operated on, also protects the surrounding parts from the heat and prevents the spread of flame. The same burner has been applied successfully to a portable forge by the manufacturers, the Chicago Pneumatic Tool Company, Fisher Building, Chicago.

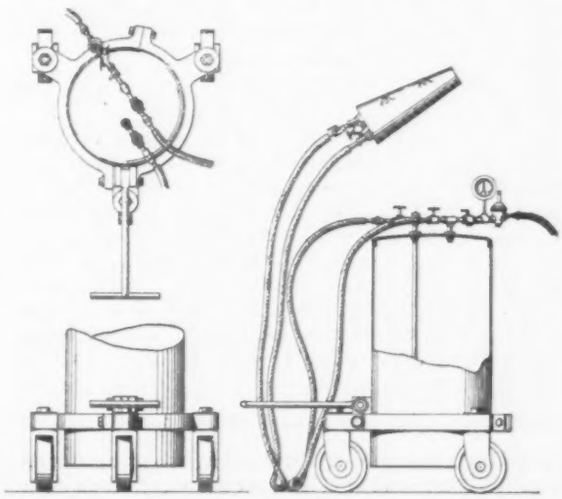
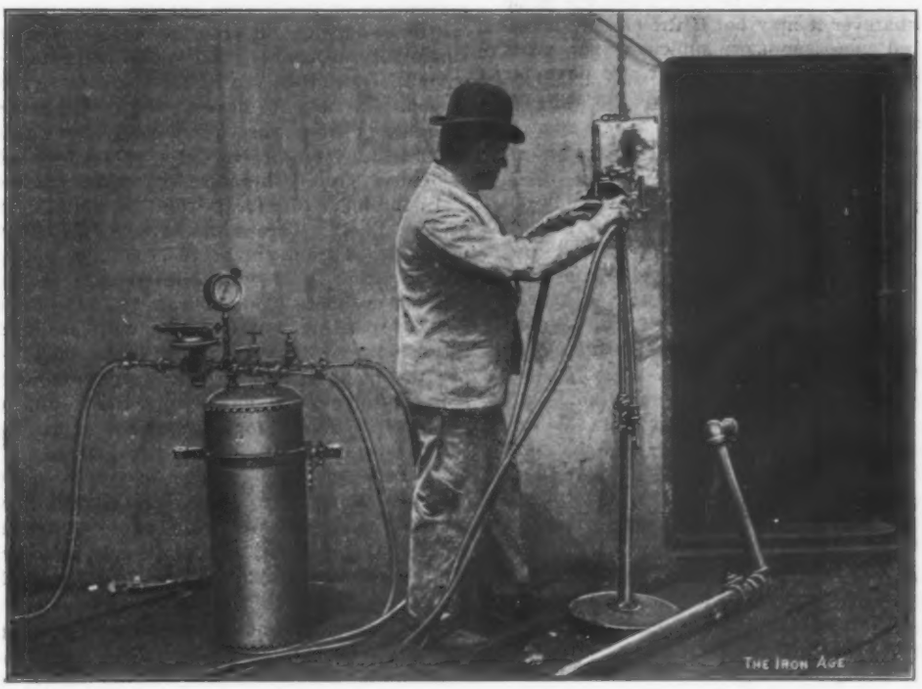


Fig. 2.—Annealer as Used for Pressed Steel Car Work.



THE TYNAN ANNEALER WORKING ON ARMOR.

It is the intention of the National Glass Company of Pittsburgh to increase their capital stock by retiring $800,000 of their common stock and issuing in its place $1,600,000 preferred stock bearing 7 per cent., $800,000 in cash being received in addition to the common shares. This will give additional working capital of $800,000, which will be used for betterments. The authorized capital is $4,000,000, but only $2,325,000 has been issued. The common stock will be reduced by the plan to about $1,500,000. The stockholders will hold a special meeting February 16 to vote upon the proposition. The company have a funded debt of $2,300,000, made up of $1,400,000 first mortgage 6 per cent. bonds and $700,000 general mortgage 6s. The first mortgage bonds are payable $200,000 per year, the original amount having been $2,000,000. The general mortgage is for $2,500,000 and was created in 1901, sufficient bonds being reserved to retire the firsts. The bonds are subject to call at 105 for a sinking fund, which is made up from 5 per cent. of the company's earnings each year.

After several months of negotiations, the Austrian and Hungarian iron and steel industries have succeeded in forming a gigantic combination, comprising 23 separate establishments, with an aggregate capital of 280,000,000 kronen, says a Reuter telegram from Vienna. The new organization is not a trust, but a "cartel," or combination under which each establishment is worked separately under the supervision of the central board, which regulates the output and fixes the prices. The new cartel includes practically every important iron and steel interest in the dual monarchy, such as raw iron, bars, plates, rails, nails and wire.

The Electric Smelting of Iron Ore.—II.*

BY A. J. ROSSI, NEW YORK.

These results being based on certain prices of materials or current, either actual or obtainable, it may be interesting for the comparison we are making of the two processes not to assume any particular prices, but to determine a general equation, showing what relations should exist between the cost of all the elements considered, in order to have an equality of cost of production by the two methods of smelting.

Let f in dollars in general be the price of fuel per gross ton, delivered at the blast furnace, f^1 in dollars be the cost of the fuel available at the electric furnace, p be the price per gross ton of the ore at the blast furnace, p^1 that of the same or a similar ore at the electric furnace, the physical character of which is immaterial in this case; both ores containing on an average 57 per cent. iron, or 80 per cent. oxide of iron (Fe_2O_3, for simplicity sake), and yielding or capable of yielding, theoretically, per 100 pounds of ore, 60 pounds of a pig iron (containing, say, 95 per cent. of iron, the balance being silicon, carbon, &c.). Since 1 pound of ore gives 0.60 pound of pig metal, in order to make 1 ton of pig we require: $\frac{1}{0.60} = 1.666$ tons of such ore. This 1.666 tons of ore contains 1.333 tons of ferric oxide, requiring for its reduction 0.224 pound of carbon per pound, or, assuming a fuel with 10 per cent of ash, 0.25 pound of fuel per unit of oxide of iron.

Calling K the constant for limestone and labor, &c., which can certainly be taken to be practically the same in both cases, whatever it may be; H the electric horse-power considered necessary or sufficient per gross ton of pig iron, and C its price per year, we have for the cost of one gross ton of pig iron made per day, assuming $2.50 for the wear of electrodes:

In the blast furnace: $P = 1.666\,p + f + K$.

In the electric furnace:

$$P^1 = 1.666\,p^1 + 1.333 \times 0.25 \times f^1 + \frac{H \times C}{365} + K + 2.50.$$

These two formulas may be written more simply:

(1) P Cost at blast furnace =

$$1\,^1/_3\,p + f + K = \frac{5\,p + 3\,f + 3\,K}{3}$$

and assuming for K $2.50:

(2) P = (blast furnace) $\dfrac{5\,p + 3\,f + 7.50}{3}$

and at electric furnace:

(3) P^1 (electric furnace) =

$$\frac{5\,p^1 + f^1 + 0.00822\,H \times C + 3\,K + 7.50}{3}$$

and for $K = 2.50$, as in blast furnace:

(4) P^1 (electric furnace) $= \dfrac{5\,p^1 + f^1 + 0.00822\,H \times C + 15}{3}$

If we assume $H = 200$ horse-power per gross ton, a moderately high practical figure, which we have obtained and which, if we admit the calculations of others, could be bettered, we have:

(5) Cost at electric furnace, $P^1 = \dfrac{3\,p^1 + f^1 + 1.644\,C + 15}{3}$

and, for equality of cost by the two methods, we have in general:

$$\underbrace{\frac{5\,p^1 + f^1 + 0.00822\,H \times C + 3\,K + 7.50}{3}}_{\text{(Electric furnace)}} = \underbrace{\frac{5\,p + 3\,f + 3\,K}{3}}_{\text{(Blast furnace)}}$$

or, since 3 K, common to both members, disappears, whatever value we may have assumed for it,

$$5\,p + 3\,f = 5\,p^1 + f^1 + 0.00822\,H \times C + 7.50,$$

from which we find as a general formula:

(6) $C = \dfrac{5\,(p - p^1) + 3\,f - f^1 - 7.50}{0.00822\,H}$

For $H = 200$ horse-power:

(7) $C = \dfrac{5\,(p - p^1) + 3\,f - f^1 - 7.50}{1.644}$

Formula No. 7 shows what the electric horse-power should cost per gross ton per year to reach equality of cost of production of 1 gross ton of pig iron per day by the two methods of smelting.

The above equation (5) shows that C varies inversely as H, the horse-power per ton; hence, having found C by an assumption of $H = 200$ horse-power, by equation (5) we can find C for any other horse-power, H_1, which would be considered admissible, by a simple rule of three: $C_1 = \dfrac{C \times H = 200}{H_1} = \dfrac{C \times 200}{H_1}$ and we need not use the general formula of equation (4) for C, but equation (5).

From equation (6) we have also:

(8) $(p - p^1) = \dfrac{0.00822\,H \times C - 3\,f + f^1 + 7.50}{5}$

in general and, if $H = 200$ horse-power:

(9) $(p - p^1) = \dfrac{1.644\,C - 3\,f + f^1 + 7.50}{5}$

This equation represents what should be the difference between p and p^1, or the price of ore per gross ton at the blast and at the electric furnace, for an equality of cost of production for a given price of current per year.

We should remark that an average of the run of the mine at 57 per cent. of iron will practically answer all purposes for an approximate comparison. A richer ore delivered at the blast furnace from a long distance will be paid for at the rate of so much the unit of iron. Since the electric furnace will be located at or in the immediate proximity of the mine and the ore is put in at practically the cost of mining, the increased percentage of iron does not affect its price. As to the amount of carbon, or its equivalent in fuel, at the electric furnace it is clearly the same, whatever may be the percentage of the iron in the ore, since the amount of ore to be smelted in order to make 1 ton of pig iron varies just in inverse ratio to the percentage of iron it contains. In other words, for the same quantity, it is obvious that we will have to reduce the same quantity of oxide of iron, whatever may be the amount of ore that we may require in order to secure this quantity of oxide of iron. Therefore, f^1 remains the same.

In the blast furnace, within the limits of percentage of iron likely to occur in the ores, say from 56 to 63 per cent., the amount of fuel will not be sensibly affected, either, and f will also remain the same. For a richer ore more oxide of iron will have to be reduced, strictly speaking, but less slag will result and within these limits, with a favorable factor of 1 ton of coke per ton of iron, and a rather unfavorable figure, 200 horse-power per ton, electrically, the results will not be practically affected for our purpose of an approximate estimate of the value of the two methods.

However, if this percentage of iron in the ores, above or below 57 per cent., even within the reasonable limits we have mentioned, were to be considered of importance as affecting the results it can easily be taken care of in the formulæ, so as to make them as general as possible.

Let m per cent. and m^1 per cent. be, respectively, the percentage of metallic iron in the ores used in the blast furnace and electric furnace. If, as before, we assume that pig iron contains about 95 per cent. iron, 1 ton of iron in the ores corresponds to 1.05 tons of pig iron.

For 1 ton of pig iron we want:

$\dfrac{100}{1.05\,m}$ of the blast furnace ore $= 0.95 \times \dfrac{1}{m}$

$\dfrac{100}{1.05\,m^1}$ of the electric furnace ore $= 0.95 \times \dfrac{1}{m^1}$

We have then:

(10) Cost at blast furnace:

$$P_1 = 0.95 \times \frac{1}{m} \times p + f + K$$

(11) Cost at electric furnace:

$$P_1^1 = 0.95 \times \frac{1}{m^1} \times p^1 + \frac{f^1}{3} + 0.00274\,H.C + 2.50$$

and for equality of cost of production in general:

(12) $C = \dfrac{0.95\left(\dfrac{p}{m} - \dfrac{p^1}{m^1}\right) + f - \dfrac{f^1}{3} - 2.50}{0.00274\,H}$

* Concluded from *The Iron Age*, November 20, 1902, page 5.

and for $H = 200$ horse-power:

$$(13)\ C = \frac{0.95\left(\frac{p}{m} - \frac{p^1}{m^1}\right) + f - \frac{f^1}{3} - 2.50}{0.548}$$

Being given in a certain locality the prices of fuel, ore and stone, and of current per year, and what these materials cost at the nearest working blast furnace, on the assumption of 200 horse-power electrically supplied per gross ton of pig iron, we can find from the general formulæ (1 and 2), (3 and 4), the approximate cost of the ton by the two processes, and from the general formulæ (6 and 7) what should be the cost of the current per year, if it has to be established or if it is supplied by outsiders, for an equality of cost of manufacture, and if it can be delivered at a smaller figure than thus calculated the advantage is in favor of the electric smelting. Knowing the price of the current we can calculate $p-p^1$—that is, what margin is left for the price of ore at the electric furnace. If the assumption of 200 horse-power appears too high or too low, a rule of three will show how to correct the figure obtained on a basis of 200 horse-power for the special horse-power considered admissible.

One of the very important factors in the relative economy of the two processes is "How many horse-power are required per ton of pig iron?" It has formed the principal subject of this examination, and we have given formulæ to calculate the probable cost of the two processes and for an equality of the same, assuming a figure (200 horse-power per ton of pig iron) which we believe will be considered conservative, in order to present the comparison in conditions not particularly favorable to electric smelting.* Others have claimed a much lower horse-power per ton than we have done. In furnaces properly constructed for the purpose and in which the heat of the combustion of the escaping carbon monoxide would be effectively made available, better results could be secured and legitimately expected, but they cannot be such as to violate the laws of thermodynamics of equivalence of heat and energy. By referring to Table I one can see that, with a full yield and no allowance for any kind of loss, excepting non-utilization of the gases, with an ore such as we have smelted and taken as the basis of calculations, the best that we could have obtained theoretically would have been 175 horse-power per ton (Table I, *f*, column 4), and that the calculations of the writer of the article in *Engineering News*, calculations perfectly correct, give, on an assumption of a very pure iron ore (Table I, C, column 4), in an electric furnace working theoretically perfectly, 146 horse-power. With an iron containing nothing but oxide of iron (Fe_2O_3), chemically pure, the calculation of heat necessary to reduce 1 pound of iron from its oxide (Fe_2O_3) would give 146 horse-power per gross ton of pig iron containing 95 per cent. iron, the balance being carbon only.

Must we conclude from this discussion that the electric smelting is to supersede the blast furnace practice? Even if the enormous electric plants necessary to smelt per day what our present large blast furnaces produce were to be available, we do not pretend to say that they could necessarily be established at the cost of an equivalent blast furnace. Electric smelting, at least actually, cannot certainly make such claim, but what we believe it can do, and we think that the above shows such a possibility, is that for good iron ores, free from injurious elements; for ores in such physical state as sands and powder, unfit for blast furnace use or which can only be used sparingly or after special mechanical preparations; for ores which, owing to some of their constituents, can yield a valuable pig iron; for good ores in general which are not easily or immediately accessible and therefore of no important use, electric smelting does open a field of usefulness. The metal electrically obtained is of as good a quality, at least, as that smelted in the blast furnace and can be obtained at a cost equal or even lower, under special favorable circumstances, than by the present process applied to the same ores, provided the electric power can be developed right where such ores are abundant, easily mined and obtained at a lower cost than similar ores could be delivered at a blast furnace, or if such electric power can be secured at a comparatively low cost by a plant already established. The advantage of the electric power is that it can be collected from different sources and delivered by a wire at a distance from its place of production.

We believe also that, in certain districts where such cheap ores and water power are available, and where the erection of a blast furnace, for reasons of lack of fuel or inadequate quality or for any other causes, could not be remunerative, a profitable local, limited industry could be established, supplying the pig iron for local wants and for such allied products as require the pig iron as raw material. This would be particularly the case if the rate of transportation of this pig iron from a blast furnace to the district constitutes a real and important premium on the cost of manufacture.

In short, it seems to us that, while some metallurgists, treating the question on a sound and incontestable scientific basis, have shown the fallacy of the claims of the too fervent apostles of the new creed, they have not taken into consideration all of the elements of the cost of manufacture of pig iron, but only some of them, such as that of fuel consumed in a blast furnace per ton as compared to its equivalent of mechanical energy electrically developed. They have ignored such other items of cost as that of the ores themselves, and even of fuel, assuming even an annual cost for electrical energy which, instead of being a minimum, as they stated, is on the contrary at the present time nearer a maximum. The equation led them to an unavoidable result, but as it did not involve all the elements of the problem, the solution, mathematically correct, was not the true one.

It is more logical, it seems to us, to conclude that it is a question of dollars and cents in each case, a question which can only be determined by local circumstances and conditions of power available, physical and other characters of the ores and fuel, their situation, the extent of the deposits, the cheapness of mining, the cost of labor and transportation of the raw materials or the product, the local demand for the latter and even its special qualities in certain cases and thereby increased value on the market. All these considerations, taken together, may decide the question in favor of the electric smelting, the essential character of which is to adapt itself to surrounding conditions and to the demand and to allow a limited and divided production instead of its concentration in enormous plants requiring for their erection enormous capital and the control of the means of transportation of the different materials, fuel and ore, and even of the mines themselves. With them electric smelting will never compete as to amount of production, if it could do so as to cost.

In the *Comptes Rendus de la Société de l'Industrie Minerale* (December, 1901, January, 1902), there has appeared an article by Mr. Pitaval on this very question of electric smelting, and as, on many points, its conclusions are much the same as ours, it may be interesting to quote them briefly. After a few considerations on this new industry, which, he says, "so justly occupies the attention of engineers," the author remarks that in the present state of the arts and in most cases, no process of reduction of iron ore in the electric furnace can stand the comparison, economically speaking, with that of the ordinary blast furnace—that is, "whenever the ore and fuel are in proximity to each other and to the blast furnace, but when these conditions are not fulfilled and specially when it is a question of manufacturing certain grades of iron or of treating certain ores physically unfit for the blast furnace, the question of the electro-metallurgy of iron must be considered seriously, particularly if one has to deal with isolated deposits of rich ores, as many are found in Spain, Italy, Greece, Sweden and elsewhere." Speak-

* Our calculations are based on 1 horse-power electric being the mechanical horse-power. If in the calculations made in Europe, it means the kilowatt; this means 1.33 mechanical horse-power, and the figures in horse-power should be increased 33 per cent. for European data.

ing of France he remarks that a great number of its colonies possess remarkable deposits of iron and very little of mineral fuel. The electric smelting appears to him then to be very practicable, provided water power in sufficient quantity is available at a fair price. This proved true for French colonies sooner than he expected. We have been (in the early months of this year) consulted on this very subject of electrical smelting of immense deposits of sands in Martinique, sands either very rich in iron (58 to 60 per cent.) or easily and cheaply concentrated, forming an ideal stock for an electric furnace, as they could be delivered at the electric furnace, we were told by the parties alluded to, at less than 40 cents (2 francs), with labor at 50 cents a day (2½ francs), and water power close by, which could easily and cheaply be made available, as also charcoal, which could be made in the immediate vicinity. The fearful catastrophe of last summer has, of course, put an end to this scheme. In a general way, Mr. Pitaval recalls that electric furnaces have several advantages over blast furnaces. Their construction is simple, much less costly; their working can be continuous or intermittent, according to the state of the trade; they can change their production at once, and a greater temperature is possible, which increases the fluidity of the metal; a great quantity of carbon monoxide is obtained, whose heating power can be utilized to increase the production of a given number of horse-power by preparing the charges for reduction or for other uses. Furthermore, as we have remarked, the carbon in the electric furnace is only there for the reduction of the oxide of iron of the ore, and consequently the amount of fuel required is but a fraction (one-quarter to one-third) of what is actually necessary in the metallurgical treatment of the ore in a blast furnace and we can add, its physical state is immaterial in the electric smelting, while it is of paramount importance in the other case.

The Elasticity of the Currency.

William B. Ridgely, Comptroller of the Currency, who was so long prominently identified with the iron industry, has delivered an address before Group VIII of the New York State Bankers' Association, which was very well received. He touches upon weighty problems as will be noted from the following passages in his speech:

Any complete and satisfactory solution of our present currency problems should include some plan for the retirement of the legal tenders. While I firmly believe the currency would be greatly improved by this retirement and especially that it would make a place for bank notes which would be much better for our people in every way, I do not agree with this extreme view. I believe the bank note circulation can be greatly improved by a few quite conservative changes which will add to its elasticity, or rather introduce some elasticity where there is now practically none. These changes are not new suggestions; they have been considered and discussed for several years.

The Committee on Finance and Currency of the New York Chamber of Commerce in their report recently submitted have set a most excellent example. The act of 1882 contains a prohibition of the retirement of more than $3,000,000 of national bank notes in any calendar month. This prohibition has not only prevented the contraction of the currency when notes have become redundant, but also prevents expansion when it is needed. Owing to this difficulty of retiring their notes, many bankers refuse to increase their circulation when otherwise they would do so. The restriction should be removed. If there is nothing else done in regard to the currency this should be done at once.

The prime requisite for an elastic currency is frequent redemption and freedom of retirement. To have proper and true elasticity, contractibility is as necessary as expansibility. It is shown by the experience of all countries and systems of currency that the main reliance for contraction should be redemption. It is more reliable than any tax restriction or regulation.

To introduce our expansibility into our bank currency we must sooner or later get away from bond security in some way; either do away with it altogether or require part bond security and allow a certain portion of each bank's circulation to be uncovered by bonds. The best bank circulation is one currently redeemed in gold coin and based entirely upon an ample gold reserve held by the bank especially if made additionally secure by a guaranty fund raised by a tax or premium on circulation.

I think the best plan which has been suggested for modifying our bank currency is to allow the banks to issue more than the par value of the bonds deposited. The first consideration should be to make these notes absolutely secure to the holder. No change in our bank notes is justified, however advantageous it may be in other respects, which in any way impairs their safety.

The Government can safely guarantee or insure these notes if protected by the bonds held for a part of their value, and, in addition, by a guaranty fund to be raised by a tax or premium for insurance levied on the bank circulation.

These additional notes should be exactly the same in form and in all respects as those now issued. In fact, the change should be merely the increase of the permission so that a bank might issue one and one-half times the par value of the bonds deposited, the maximum amount of bonds remaining the same as now, equal to the capital stock of the bank.

The banks should be required to carry additional cash reserve against the uncovered portion of their notes. I do not like the expression or the idea of an emergency currency. What we want is a currency so safe and elastic that it will prevent emergencies. Above all, this currency should be constantly changing, coming and going, so that issuing it would not be any confession of weakness or indication of an emergency on the part of the issuing bank. The last thing a banker wishes to acknowledge is that there is any emergency in his affairs, and the issue of bank bills which were regarded only as emergency notes would be apt to only hasten and aggravate an emergency which might otherwise never occur, or, if it did occur, might be easily overcome.

It is going to be extremely difficult to get anything done in the way of currency legislation. To accomplish anything there must be united and strong effort. There should be no pride of opinion or authorship in these matters and no desire to have something new. Stability and soundness are the first requisite for a financial proposition—novelty is the last. It is up to you to act.

The Consolidated Lake Superior Company.

Theodore C. Search of Philadelphia, vice-president and treasurer of the Consolidated Lake Superior Company, has made the following statement regarding the work necessary to complete the different undertakings of that company:

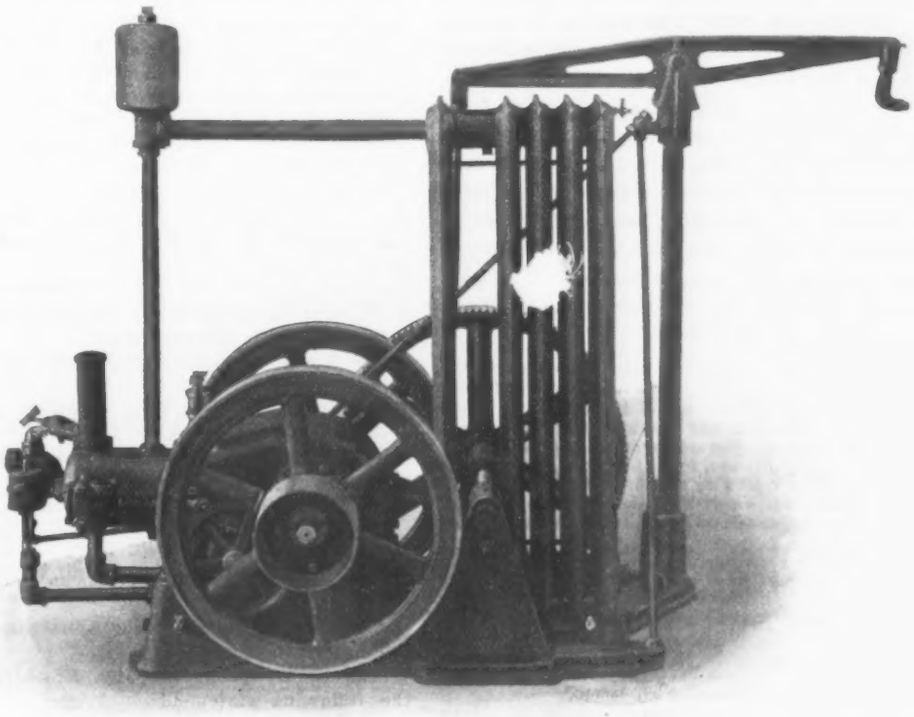
The Bessemer steel works and rail mill are completed and fully equipped; but the two blast furnaces to supply pig iron for these plants are still unfinished, owing to extraordinary delays on the part of contractors for material, machinery and equipment. Their completion is not counted upon before early in the spring, although the present stage of the work seems to offer hope that they will be finished earlier. The Algoma Central & Hudson Bay Railway is finished and in operation for a distance of 93 miles, and the intervening section of 99 miles necessary to complete rail connection between the iron mines on the Michipicoten range and the blast furnaces at Sault Ste. Marie is all graded and ready for track laying. Several bridges, however, are to be built on this line.

The great water power canal upon the Michigan side of the St. Mary's River and its power house are completed and the installation of the power house equipment is well advanced. For the treatment of the nickel ores from the company's mines near Sunbury one smelter has been in operation for several months, two more are under construction, and a Bessemerizing plant for the further concentration of the matte produced by these smelters is under contract. All of the other works are practically complete and in operation.

A Frost Proof Gasoline Pumping Engine.

No water is used for any purpose about the gasoline pumping engine built by the Fuller & Johnson Mfg. Company of Madison, Wis. The engine is equipped with an iron radiator and connections for circulating oil, instead of water, through the jacket of the cylinder. The indicator is fitted and sealed before leaving the factory, and as there is no escape the first supply of oil will serve the purpose for an indefinite length of time. This not only insures against loss of the cylinder by water freezing in the jacket, but it also saves the expense of drawing and refilling tanks and pipes in cold weather.

The method of spraying the gasoline enables the operator to start the engine in damp or cold weather, without employing artificial means for heating the mixing chamber. Either end of the connecting rod can be adjusted without removing the rod or piston. The crank and connecting rod are inclosed in a dust proof, self oiling case, and can be operated without injury in places where dirt and grit would quickly ruin exposed bearings.



A FROST PROOF GASOLINE PUMPING ENGINE.

The special 1½ horse-power geared pumping engine, shown in the engraving, is mounted on an iron base, to which is also attached the radiator containing the cooling oil, the iron stands that support the shaft of the reducing gear and the standards for the pumping beam.

Jones & Laughlin Steel Company.—Announcement was made last week by B. F. Jones, Jr., president of the Jones & Laughlin Steel Company, Pittsburgh, that the surveys of the railroad which this company will build to the lakes have been completed and that the construction of the line may be commenced within three or four months. "The line is to be built," Mr. Jones said. "We are not building it with any one else, nor are we making any joint agreements concerning its operation. Geneva harbor is bought and paid for by us. It will be used exclusively by us, and reports of other lines or railroads having traffic arrangements with us for a use of the harbor are not based on fact. The same may be said concerning the rumor that there is to be a connection between our line and that of the Wabash Railroad in connection with the lake port. The fact is, the new road for our company is to be built entirely as an independent line, and without connection of any kind with other roads or companies. It will be strictly for the use of the Jones & Laughlin Steel Company, and for this reason we think it best to keep away from all other enterprises."

Grain Drill Companies to Consolidate.

Press dispatches from Springfield, Ohio, state that a consolidation of grain drill companies is being perfected. The headquarters will be in that city, where one-half of the grain drills of the world are made. The capital stock will be $20,000,000. The deal is being conducted by New York capitalists. The companies who will enter the combine are: The Superior Drill Company and the P. P. Mast Company of Springfield, Ohio; the Hoosier Drill Company of Richmond, Ind.; the Empire Drill Company of Shortsville, N. Y.; Brennan & Co. of Louisville, Ky.; the Dowagiac Mfg. Company of Dowagiac, Mich., and the Blickford & Huffman Company of Macedon, N. Y.

It is reported as probable that two or three of the smaller concerns will be closed, in which event the two Springfield plants will be greatly enlarged. The Superior Drill Company have the largest works in the proposed consolidation and are planning to increase their facilities, owing to many foreign orders.

The Warren Brass Company, organized at Warren, Ohio, with a capital of $30,000, have taken over the business of Wood & King. The concern are manufacturers of fine brass goods for plumbers' use, and when in full operation expect to employ about 50 men. C. L. Wood has been elected president, E. L. King, secretary and treasurer, W. I. Jencks, vice-president and superintendent. These officials, with W. C. Cottle and H. W. Risk, constitute the Board of Managers.

The New England office and salesroom of the Prentiss Tool & Supply Company, William F. McCarthy, manager, makers of improved machine tools, have moved from 200 Franklin street, Boston, to 145 Oliver street. Their new quarters are in the center of the machine tool trade, with frontage on two streets, and are large and attractive.

Foreign Foundry Pig Iron.

How Imported Irons Meet American Requirements.

For a considerable part of this year many foundrymen, especially those located in the Eastern part of the country, have been compelled to rely more or less on imported pig iron. While this is not a novel experience in this country, so many years had elapsed since the use of foreign pig iron here to any extent that it came as an unusual experience to foundrymen of the younger generation. Deeming the subject a matter of considerable interest, we have addressed a circular letter to members of the foundry trade, asking for their experience in substituting foreign for American brands of pig iron. The circular letter was sent to a selected list, comprising foundrymen who were presumed to be so situated that they had been buyers of foreign brands. We have been somewhat surprised at the result of our inquiries. Out of 51 replies no less than 25 have been received from foundrymen who state that they had been able to secure sufficient domestic iron to relieve them from the necessity of purchasing any foreign brands. We had been led to believe that there were few Eastern foundrymen who had not been driven to use at least a small quantity to cover their requirements. Following is a copy of the circular letter:

As the use of foreign pig iron has been widespread in the American foundry trade this year, owing to special conditions, it has occurred to us that manufacturers and consumers would alike be interested in knowing how the imported brands have met American requirements. We are therefore applying to you and other prominent foundrymen for information on the subject. Kindly let us have replies to the following questions, advising us at the same time whether you have any objection to printing your name in connection with the information furnished us:

1. Have you used any considerable quantity of foreign pig iron, and if so what proportion of your total consumption since you began its use?
2. What foreign brands have you used and from what country?
3. Have you found any trouble in getting satisfactory castings when you used them? If you have, please state the brands causing the trouble and the nature of the trouble.
4. Has it been necessary for you to adopt any special method of using foreign brands, or have they been used in the regular way just as you would arrange mixtures for American pig iron?
5. How have you found their scrap-carrying quality as compared with American brands?
6. Have you found much difference in shrinkage, and if so in what respect?

An early reply will be greatly appreciated, as it is our desire to present the result of these inquiries as speedily as possible.

We have arranged the replies according to the class of products manufactured and present them as follows:

Heavy Machinery Castings.

The Baldwin Locomotive Works, Philadelphia:

"We pursue special methods both in purchasing and in mixing irons. It has been our practice for years to entirely disregard the brand of an iron and to purchase it subject to analysis, and our charges have been proportioned so as to obtain a casting of a predetermined analysis. While we receive irons from many quarters we therefore secure material of a uniform grade, and when special conditions compel us to purchase an iron very different from our standard specification we are not handicapped, inasmuch as we are still able to produce a casting of the desired composition by varying the proportions of our charge. In following these methods we have had no difficulty in the using of any of the imported iron, but a comparison of the analysis with those of American irons will show that those foundries that grade their irons would be compelled to experiment a good deal before being able to satisfactorily use the irons. The characteristic analysis of the five brands of iron that we have received is shown in the following table:

	English.	Scotch.		German.	
Contents.	A.	B.	C.	D.	E.*
Carbon (combined)	0.25	0.46	0.29	0.19	0.34
Manganese	1.57	2.62	1.10	0.42	0.42
Phosphorus	0.068	0.82	1.20	0.54	0.53
Sulphur	0.040	0.039	0.053	0.018	0.020
Silicon	3.45	2.68	3.55	2.82	1.65

* Special grade hard iron.

"The silicon and the fracture would indicate that the English and Scotch irons would carry a very large proportion of scrap, but this is not the case because of the large proportions of hardening elements that the irons contained. We can give no definite figures on this feature, for we proportioned the quantities of the iron used in the charge with a view of bringing the manganese and carbon within normal limits. Because of the peculiarities of the English and Scotch iron we used them in rather small percentages and only in conjunction with American irons. The particular brands of German iron, however, were strictly within our specifications, and we used them in precisely the same manner and the same proportions as American irons.

"During the past six months we have purchased 5000 tons of these irons, and we have experienced no trouble in their use. It may be that these irons are not strictly representative of those used for foundry purposes in the countries that supplied them, for many analyses were submitted to us, and we picked the irons most suited to our requirements and then adopted measures to insure that material was supplied that complied with the terms of the contract."

J. B. & J. M. Cornell, New York City and Cold Spring, N. Y., reply as follows, the answers being numbered to correspond with our questions:

"1. Not a large quantity, probably 20 per cent. of our consumption.

"2. Middlesbrough, from England, and some German irons.

"3. Have had no trouble in getting satisfactory castings.

"4. Have no special method for using foreign brands, but, knowing the analysis of each brand, have made our mixtures accordingly.

"5. They do not carry scrap as well as the American irons.

"6. Shrinkage is apt to be a little more than that of the American irons."

The E. W. Bliss Company, Brooklyn, N. Y., make the following statement:

"1. About 50 per cent.

"2. Scotch iron, brand Eglinton, and German iron bought on analysis.

"3. No trouble whatever.

"4. No difference.

"5. No material difference; we use very little scrap.

"6. About the same."

The Harrisburg Foundry & Machine Works, Harrisburg, Pa., give us their experience as follows:

"1. We have used 75 tons of foreign pig iron, which was only a very small percentage of our consumption.

"2. Brand of iron was Scotch Quarter.

"3. We had no trouble whatever in getting satisfactory castings from the use of this iron, blending it with American irons.

"4. It was not necessary for us to adopt any special methods or mixtures.

"5. We found the scrap carrying qualities of the iron very good, it being capable of carrying more scrap than most of the American brands.

"6. Shrinkage was more evident with this iron than with American brands.

"Generally we consider the Quarter iron good. The silicon was high and the phosphorus also, so the iron was not very strong, but considerable scrap could be used with it and a fairly strong mixture made."

The Payne Company, Elmira, N. Y., make the following report:

"1. We first bought foreign pig iron about last July, and have used about one-third of our supply of that kind since.

"2. We used only the Middlesbrough iron from England.

"3. We have had no trouble with it.

"4. We have used this iron the same as domestic.

"5. Its scrap carrying quality is about the same.

"6. No noticeable difference in the shrinkage.

"The appearance of the iron we have used was very hard, but it has not been found so in working."

We have the following from a very large manufacturer of machinery castings:

"We are not able to answer your inquiries in detail. We can say, however, in a general way, that the use of foreign pig iron has not been satisfactory, as it did not appear to be a good substitute for domestic iron."

From a prominent Connecticut foundry we have received the interesting statement which follows:

"2. Cleveland No. 1, Middlesbrough, England, and Scotch No. 1 and No. 3.

"3. No, because we have analyzed them and mixed them with American irons in such proportions as would give a satisfactory result.

"4. This is partially answered above. We have been obliged to select low sulphur and low phosphorus American pig iron to mix with it. The chief difficulty with the brands we have received lies in the combination of elements which they contain. In one lot the manganese and phosphorus both ran very high. The manganese made it difficult to use in light work, while the phosphorus was too high for heavy work. Another lot ran too high in silicon and phosphorus for heavy work and too high in sulphur for light work.

"5. With No. 1 Scotch, by mixing with it some low phosphorus iron we were able to carry our usual quota of scrap. With the English iron we were obliged to greatly reduce our scrap on account of the high sulphur in this iron.

"6. Inasmuch as we did not use any of this iron straight, but brought it to our usual mixture by use of other iron, we are unable to answer this question. We would judge that when mixed with the standard Pennsylvania or Lake irons the foreign iron would prove satisfactory, but when used with the high phosphorus or high manganese Southern irons considerable difficulty might be experienced by those mixing by fracture. On the whole, we consider the foreign iron which we have used much inferior to the average American iron.

"The analyses of the foreign irons were:

	Scotch No. 1.	Scotch No. 3.	Cleveland No. 1.
Silicon	3.09	3.19	2.85
Sulphur	0.02	0.052	0.06
Phosphorus	1.05	1.13	1.56
Manganese	1.31	1.28	0.63
Total carbon	3.43	3.23	3.45

A large maker of machinery castings in one of the Middle States says:

"We think that there is not a single brand of foreign pig iron that we know of being imported in this country that will begin to compare with the standard brands made in this country. We were induced last spring to try one sample car, which we finally used up as we would a lot of very poor scrap. The writer remembers that when a boy Scotch iron was considered a necessity in our foundry mixtures, but we know now that if we only had such iron it would be utterly impossible for us to make the castings we do.

"We cannot express an opinion on the shrinkage of foreign irons, but we know that this is one of the most important values in any brand of pig iron, and while it is not often so considered, we deem it of the utmost importance. We mean by shrinkage the difference between the length of a pattern and the length of a casting. We fully appreciate that some pig iron is better adapted for certain purposes than others, and what would be suitable possibly for our average requirements would not answer for some others."

The Machine Tool Trade.

We have the following from the Pratt & Whitney Company, Hartford, Conn.:

"We have purchased Cleveland iron—that is, iron from the Cleveland district in England, an iron that analyzes satisfactorily—and also iron from Scotland, and have used these irons in connection with excellent American brands, selected scrap and foundry scrap. Both irons were reasonably high in phosphorus, low in sulphur, of good grain, but the result was hard castings. We endeavor to keep the silicon in our mixtures as it has been, in the neighborhood of 2¼ per cent., but this was not the difficulty. We are now using 25 per cent. of the charge of the combined English and Scotch irons and find our castings cut at about two-thirds the speed that they did with American irons before the anthracite strike trouble commenced, when we had command of the different mixtures. We do not mean that we could go into the market now and buy American irons that would give us better results than this mixture of American and foreign, as so far as we can judge the American irons are not readily procurable, of desired compositions and character.

"We use more fuel in the cupola in melting our present mixture than we formerly did, with the idea that it benefits us, and by pouring quite hot we do away with the skin chill which gives us so much trouble. We have found no difference in the shrinkage. Our castings are now particularly clean, as good as they ever were; the grain is close and the surface polishes beautifully."

Gould & Eberhardt, Newark, N. J., say:

"1. We have only had occasion to use about 100 tons of foreign iron, and it is used in proportion of about 30 per cent. with foreign brands—that is, since we have started using the foreign iron it has amounted to about 30 per cent. of our consumption.

"2. The foreign iron we have referred to is from Germany.

"3. We have not had any trouble whatever from this German iron; in fact, it has given us very good satisfaction, but was bought on analysis.

"4. We have used this iron in the same way that we use American pig.

"5. The scrap carrying quality of this iron is about the same as compared to the American irons.

"6. So far as shrinkage is concerned, we would say that what we have used of this foreign iron, it seems about the same as domestic, with a tendency to less shrinkage."

The Pond Machine Tool Company, Plainfield, N. J., write as follows:

"We have not used a considerable quantity of foreign pig iron. The kind that we have bought most of is Middlesbrough. We cannot say that we have had any trouble in getting satisfactory castings from foreign irons, for this reason: We have had, in order to get irons, to take anything that we could get of American and foreign irons, with the result, of course, that our castings are not as satisfactory as when we were using irons that we had become familiar with by years of use."

The Ingersoll-Sergeant Drill Company, Easton, Pa., say:

"We have used a few hundred tons of foreign iron this year and have found it to be satisfactory, but it was such a small part of our total consumption that we really gave it very little consideration. It compared favorably with the domestic brands we have been using, and later on we may be obliged to purchase more of it, depending entirely on the difficulty we may have in getting our orders for pig iron filled in this country."

The Putnam Machine Company, Fitchburg, Mass., make the following statement:

"1. We are necessarily using considerable quantities of foreign pig iron, a large proportion of our total consumption.

"2. We are using German and Scotch irons.

"3. We have found no trouble in getting satisfactory castings from these irons.

"4. We adopt no special method in using the foreign brands, using them in the regular way, arranging the mixtures the same as with American pig irons.

"5. The scrap carrying qualities of the foreign iron are about the same as the American brands.

"6. There is no particular difference in shrinkage.

"We find the German iron a very fine quality of iron, only that it is not graded the same as American iron, that is, in the same lot of iron there will be three grades, but the grades being so comparatively even, in us-

ing the German iron we see no particular difference. Using Scotch pig iron is not a new experience to us. We used large quantities of Scotch iron before a pound of soft Scotch pig iron was made in America. Scotch pig iron we have supposed was celebrated for its softness and its excellent scrap carrying and nonshrinkable qualities."

Stoves and Other Heating Apparatus.

The Abram Cox Stove Company, Philadelphia, say:

"We have used during the past season some 3000 tons of foreign iron, consisting of Dominion from Nova Scotia, Middlesbrough from England, Eglinton Scotch and Budereus German. We found decided difficulty in getting satisfactory castings during the past season, owing to the fact that it seemed to be impossible to buy proper irons for mixture. This trouble did not arise from foreign irons, but arose from the fact that we could not buy either foreign or American irons of a proper analysis. The scrap carrying qualities, the methods of mixture, shrinkages, &c., depend entirely upon the analysis of the iron, and we are compelled to work very closely along these lines, the principal difficulties being high phosphorus and an excess of sulphur in our fuel."

The J. L. Mott Iron Works, New York, make the following statement:

"We have used a considerable quantity of foreign iron, but not in excess of 25 per cent. of the mixture at any one time. We have used English, Scotch and German irons. The only trouble we have experienced is dirty irons, which came principally from the English brands.

"We have not adopted any special method of using the irons except the ordinary precaution one would exercise in dealing with irons with which he was unfamiliar, and of which a reliable analysis could not be obtained without considerable delay. We had no means of testing the scrap carrying capacity of foreign brands save to note that it appeared to be the same as that of the irons they replaced in the regular mixture, which had fair capacity. Regarding shrinkage, we would say that it was not sufficiently high to affect our mixture. The German iron was very satisfactory in this respect."

From a New York firm we have the following:

"We have used several thousand tons of foreign iron, which amounts to about 25 per cent. of our consumption. We use No. 1 German, also Nos. 1 and 3 English. We have experienced no trouble whatever from our German iron, but the English iron has caused us considerable annoyance and trouble, on account of its running high in phosphorus. It has not been necessary for us to adopt another method to use the German iron, but we use it in our regular way, the same as we use our American brands. German iron carries scrap very nicely, just as well as the American brands which we have been using. We have experienced no shrinkage in our German iron, but would say that the shrinkage in the English iron has been considerable."

Another New York firm report as follows:

"We bought 100 tons of No. 2 Quarter iron, and were unable to successfully use more than 10 per cent. in our mixture. We found that it ran very high in manganese, which caused considerable shrinkage, and it was with great satisfaction that we used the last of it."

The Weir Stove Company, Taunton, Mass., write as follows:

"For the last five months we have been using Eglinton Scotch iron to the extent of about 15 per cent. of our entire melt, and of German iron we have been using about 30 per cent. during the last two months. This German iron analyzes 2½ to 3 per cent. silicon, 0.60 manganese, 0.60 phosphorus, and 0.04 sulphur. We have had no trouble in getting satisfactory castings. We have used these foreign irons just the same as American irons with the same analysis. We have found them to be just about the same as American irons in taking scrap, and have found no difference in shrinkage. On the whole we have been happily disappointed in the quality and working of these foreign irons."

The Magee Furnace Company, Chelsea, Mass., reply as follows:

"1. Have used about 30 per cent.

"2. Canadian, brand Dominion; and Scotch, brands Eglinton and Coltness.

"3. Some slight trouble due to high manganese in Scotch iron.

"4. We mix by analysis always.

"5. Higher.

"6. More shrinkage in the Scotch iron, due to high silicon."

A New Jersey foundryman reports his experience as follows:

"We have hardly used enough of foreign pig iron to give you an intelligent reply to your questions, but what iron we have used is of rather poor quality and have had to use a good American iron to get satisfactory results."

Another New Jersey foundryman says:

"We have bought iron from England and from Germany, and we have had no trouble in using iron from either country; but we could not have successfully done so had we not the skill, which we flatter ourselves we possess, to know how to use these foreign irons. They are high in phosphorus and it is necessary for us to know exactly how to mix them with American irons; otherwise we could not have used them. Another thing, the analyses of foreign iron are not to be accepted as exact, as we have not in a single instance found them to be correct. We had to have all foreign irons analyzed before we attempted to use them in our cupola. In regard to shrinkage, we have had no trouble whatever."

Hardware and Other Small Castings.

Prominent New England manufacturers make the following report:

"1. We have used about 500 tons of foreign pig iron, about one-third of our total heat since we began to use it.

"2. German, Scotch and English.

"3. The German iron gave entire satisfaction, but the Scotch iron was poor.

"4. No.

"5. The German iron was equal to American brands; the Scotch not as good."

From a New Jersey manufacturing company we have the following:

"We have used one brand of English iron and one brand of Scotch, both of which proved unsatisfactory, inasmuch as the castings were too hard for our use as well as being far too weak."

A Pennsylvania foundryman makes the following statement:

"Since we began to use foreign pig iron we have consumed several hundred tons, or about 10 per cent. of our total consumption of iron.

"The brands which we have used are the Eglinton from Scotland, and the Middlesbrough from England.

"We have experienced no trouble whatever in getting satisfactory castings from these irons.

"No special method has been found necessary in using these brands, the regular way of arranging mixtures having been followed by us.

"We are not using any scrap, except our sprues and defective castings; and as to shrinkage, there is no difference between the foreign iron we have and the American brands."

The following comes from a Philadelphia manufacturer:

"We have used foreign pig iron in considerable quantities during the past six months, but we have done so only because of the extreme difficulty experienced in getting domestic irons. In our experience the use of foreign pig iron is far from being satisfactory.

"We have been unable to get castings as strong and as uniformly soft as our requirements demand and as we have been accustomed to get when using domestic irons. This criticism refers to the best brands of foreign iron and we assume troubles would multiply as the scale is descended."

A Connecticut manufacturer of small castings on an extensive scale says:

"We have only bought a small quantity of Scotch, of which we have put in a certain percentage with our

regular American irons. We never have used any foreign iron alone. We therefore conclude that our experience in the matter would not be of any value to you for the purpose for which you require the information."

Others Would Use It But for Adverse Reports.

Among the replies received were several from large consumers of foundry pig iron who state that they have been solicited to purchase foreign iron, and probably would have done so, owing to difficulties encountered in securing a supply of iron, but they received such adverse reports from other consumers who had tried to use foreign brands in their mixtures that they concluded not to run the risk.

The Eight-Hour Bill in the Senate.

WASHINGTON, D. C., December 23, 1902.—The Senate Committee on Education and Labor on the 20th inst. reported the so-called eight-hour bill to the Senate with a favorable recommendation but with an important series of amendments, which while eliminating some of the drastic features of the measure do not render it any more acceptable to manufacturing interests, although they are sufficiently sweeping in character to bring upon the committee the denunciation of the agitators who have urged the bill during the past five years. It can therefore be said that in its present form the bill is without friends on either side of the chamber or among its original promoters or opponents. As reported to the Senate the text of the revised bill is as follows, the words in parentheses having been stricken out of the House bill and those in FULL CAPITALS having been added:

"Be it enacted, &c., That (each and) every contract hereafter made to which the United States, any Territory, or the District of Columbia is a party, and every such contract made for or on behalf of the United States, or any Territory, or said District, which may require or involve the employment of laborers or mechanics, shall contain a provision that no laborer or mechanic doing any part of the work contemplated by the contract, in the employ of the contractor or any subcontractor for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day UPON SUCH WORK; and (each and) every such contract shall stipulate a penalty for each violation of (the) SUCH provision (directed by this act) IN SUCH CONTRACT of $5 for each laborer or mechanic, for (each and) every calendar day in which he shall BE REQUIRED OR PERMITTED TO labor more than eight hours UPON SUCH WORK; and any officer or person designated as inspector of the work to be performed under any such contract, or to aid in enforcing the fulfillment thereof, shall upon observation or investigation FORTHWITH report to the proper officer of the United States, or of any Territory, or of the District of Columbia, all violations of the provisions in this act directed to be made in (each and) every such contract, TOGETHER WITH THE NAMES OF EACH LABORER OR MECHANIC VIOLATING SUCH STIPULATION AND THE DAY OF SUCH VIOLATION, and the amount of the penalties (stipulated) IMPOSED ACCORDING TO THE STIPULATION in any such contract shall be DIRECTED TO BE withheld by the officer or person whose duty it shall be to (pay) APPROVE THE PAYMENT OF the moneys due under such contract, whether the violation of the provisions of such contract is by the contractor (his agents or employees), or any subcontractor (his agents or employees. No person on behalf of the United States, or any Territory, or the District of Columbia, shall rebate or remit any penalty imposed under any provision or stipulation herein provided for, unless upon a finding which he shall make up and certify that such penalty was imposed by reason of an error in fact). ANY CONTRACTOR OR SUBCONTRACTOR AGGRIEVED BY THE WITHHOLDING OF ANY PENALTY AS HEREINBEFORE PROVIDED SHALL HAVE THE RIGHT TO APPEAL TO THE HEAD OF THE DEPARTMENT MAKING THE CONTRACT OR IN THE CASE OF A CONTRACT MADE BY THE DISTRICT OF COLUMBIA TO THE COMMISSIONERS THEREOF, WHO SHALL HAVE POWER TO REVIEW THE ACTION IMPOSING THE PENALTY, AND FROM SUCH FINAL ORDER WHEREBY A CONTRACTOR OR SUBCONTRACTOR MAY APPEAL TO THE COURT OF CLAIMS, WHICH SHALL HAVE JURISDICTION TO HEAR AND DECIDE THE MATTER IN LIKE MANNER AS IN OTHER CASES BEFORE SAID COURT.

"Nothing in this act shall apply to contracts for transportation by land or water (nor shall the provisions and stipulations in this act provided for affect so much of any contract as is to be performed by way of transportation), OR FOR THE TRANSMISSION OF INTELLIGENCE, or for such materials OR ARTICLES as may usually be bought in open market, whether made to conform to particular specifications or not, OR FOR THE PURCHASE OF SUPPLIES BY THE GOVERNMENT WHETHER MANUFACTURED TO CONFORM TO PARTICULAR SPECIFICATIONS OR NOT. The proper officer on behalf of the United States, any Territory, or the District of Columbia, may waive the provisions and stipulations in this act (provided for as to contracts for military or naval works or supplies) during time of war or a time when war is imminent, OR IN ANY OTHER CASE WHEN IN THE OPINION OF THE INSPECTOR OR OTHER OFFICER IN CHARGE ANY GREAT EMERGENCY EXISTS. No penalties shall be (exacted) IMPOSED for (violations) ANY VIOLATION of such (provisions) PROVISION IN SUCH CONTRACT due to (extraordinary) ANY emergency caused by fire, FAMINE or flood (or due), by danger to life or (loss) to property, OR BY OTHER EXTRAORDINARY EVENT OR CONDITION. Nothing in this act shall be construed to repeal or modify chapter three hundred and fifty-two of the laws of the Fifty-second Congress, approved August first, eighteen hundred and ninety-two (or as an attempt to abridge the pardoning power of the Executive)."

The most important amendment made by the Senate Committee is that involved in the insertion of the words "upon such work," the effect of which will be to restrict the laborer or mechanic to eight hours per day on Government work, but to leave him free to labor any additional number of hours on commercial work. In the opinion of the authors of the bill this amendment completely emasculates the measure in view of the fact that, as amended, the bill in no wise limits the hours of labor, but merely the hours he can devote to a particular class of work. Next in importance the advocates of the bill regard the exemptions incorporated by the committee which include "articles" as well as "materials" such as may usually be bought in open market, and "supplies" for the Government "whether manufactured to conform to particular specifications or not." These exemptions, in the opinion of the committee, reduce the application of the bill to shipbuilders, armor plate makers, manufacturers of iron and steel, machine tools, &c., although the opponents of the bill assert that by reason of the peculiar phraseology employed the measure would have a much wider scope. The significant fact in this connection, of course, is the acknowledged purpose of the committee to visit all the annoyance and embarrassment arising under this obnoxious measure upon a few important branches of the iron and steel trade. Another important amendment is that which permits an appeal to be taken from the decision of an inspector as to the alleged violation of the law to the head of the department making the contract and finally to the Court of Claims. This modification is strongly opposed by the promoters of the bill, who are equally hostile to the amendments in the latter part of the text providing that no penalty shall be imposed for violations of the law due to any "extraordinary event or condition."

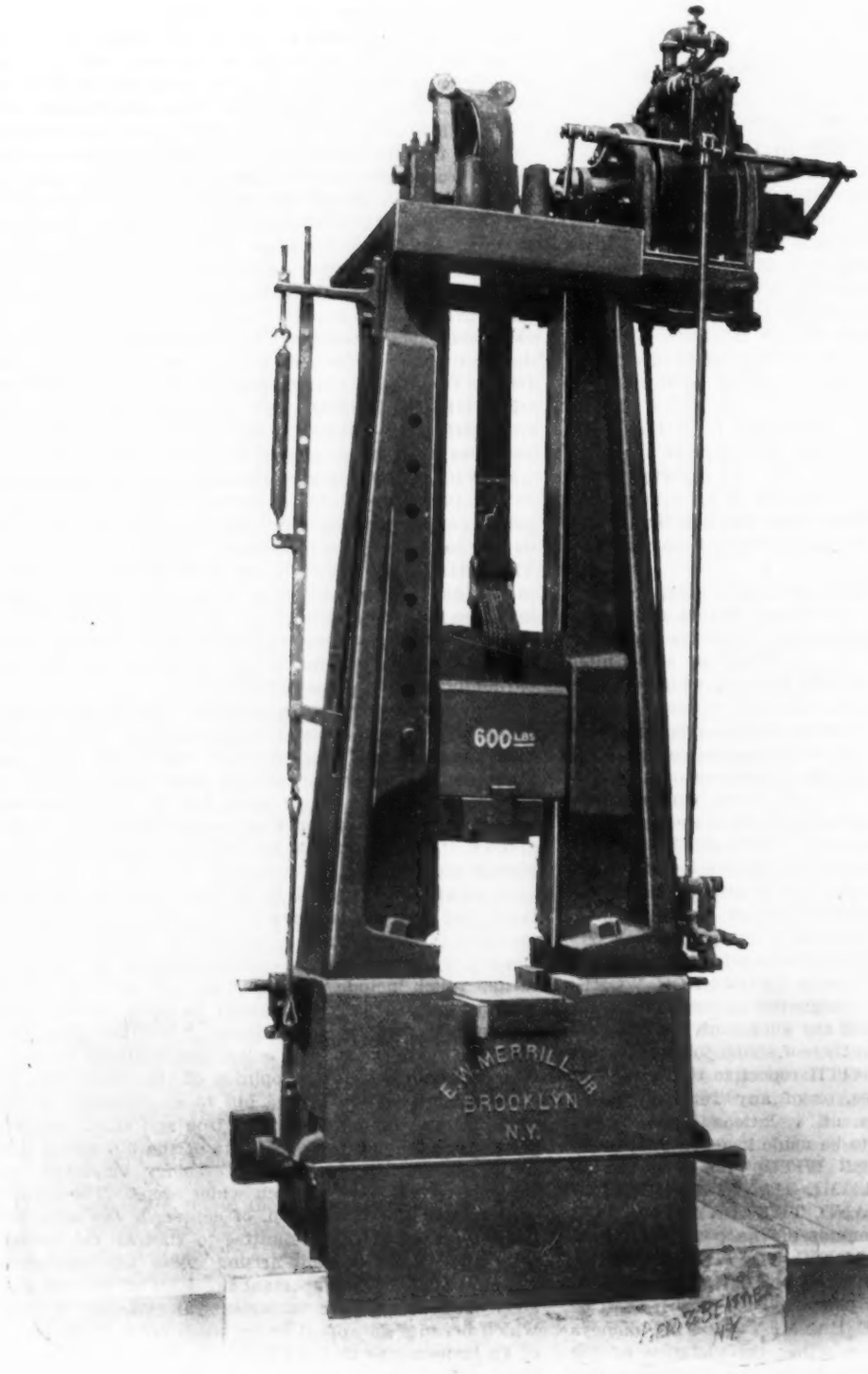
In presenting this bill in the Senate on the 20th inst. Senator McComas filed on behalf of the committee a report devoted largely to explaining the purpose behind the committee amendments. While the opponents of the bill do not admit the soundness of the reasoning employed, they are not a little pleased to find that the committee has gone upon record officially as declaring to be

unconstitutional a number of the principles upon which the original House bill was based, and which it was contended by the framers of the bill and Chairman Gardner of the House Committee were in practical consonance with the constitution.

The city of Lockport, the county seat of Niagara County, N. Y., has long been hopeful that the project of the Niagara, Lockport & Ontario Power Company might be carried to completion, and now it is intimated that capital is about to take the scheme up. The project calls for the construction of a surface canal from a point on the upper Niagara River to the vicinity of Lockport, the discharge to be made finally into Lake Ontario. It is said that English capital may invest in the project, and that some Buffalo capital will also be ready when the time comes. A franchise from the State was obtained some years ago.

The Merrill-Brett Drop Hammer Lifter.

E. W. Merrill, Jr., of Brooklyn, N. Y., is introducing in the United States the Brett patent steam and compressed air semirotary drop hammer lifters. These hammers can be operated in three ways: either by delivering a single blow, or a series of equal blows automatically, or by giving variable force blows. The blows are of that elastic nature best suited for stamping or forging, as the return is instantaneous. The hammer can be made to operate as fast as is consistent with the successful manipulation of the stock in the dies, as ordinarily at the rate of 50 to 70 blows per minute are delivered, while at a very low fall the rate would be as high as 100 per minute.



THE MERRILL-BRETT DROP HAMMER LIFTER.

The weight of hammer which can be successfully lifted is almost unlimited. If necessary hammers weighing several tons can be raised, and as easily operated as

the smaller sizes. The steam having free passage to the exhaust, the hammer consequently gives a perfectly free and full force blow.

The only connection necessary to the drop hammer is a pipe to convey the steam or compressed air, consequently it can be placed in any convenient location in the factory, irrespective of line shafting.

Compressed air for this purpose is of increasing importance. Wherever, by reason of the exclusive use of electric drive or of water power, steam is not available for hammers, compressed air can be employed in the same manner as steam and without any change of the parts. While operating no power is lost in changing the direction of motion, as the piston shaft merely partly rotates in its bearings in returning to the starting point.

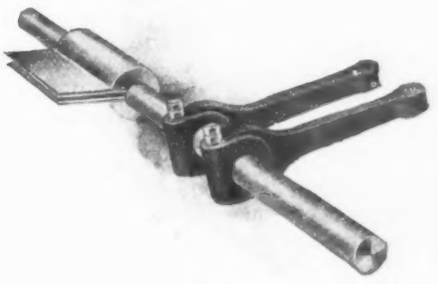


Fig. 2.

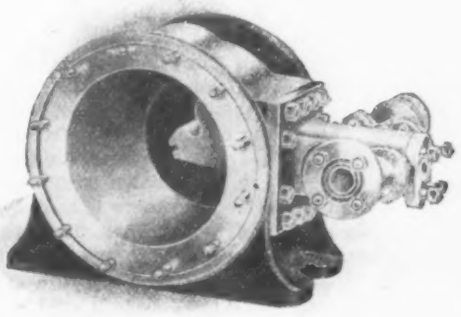


Fig. 3.

Parts of Lifter.

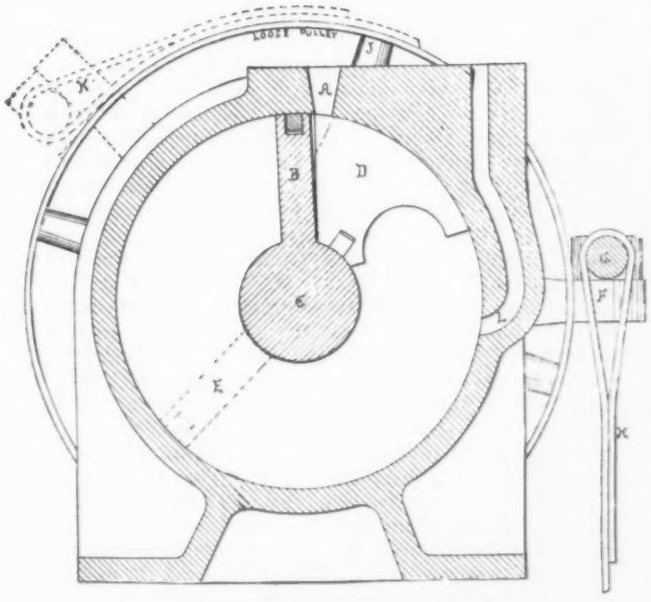


Fig. 4.—Section through Cylinder.

These lifters are very successfully used in connection with hammers having a very large striking surface, as any unevenness of the surface or looseness in the guides does not affect the lifter or connections.

Fig. 1 shows a self contained automatic drop hammer, operated by a semirotary lifter. At the right hand side of the drop hammer are fastened two levers, each connected to a small rod. The right hand lever controls the throttle valve, and the left hand lever controls the automatic trip valve. The automatic lever is placed between quadrants containing a series of notches, holding the lever in any desired position. This regulates the highest, lowest and intermediate points at which the hammer trips automatically. The change in hight of automatic tripping of the hammer can be made in a few seconds, while the hammer is either at rest or in operation. There are no rods or slides for the hammer to strike. The tripping is accomplished by the semirotating shaft, and without jar or wear.

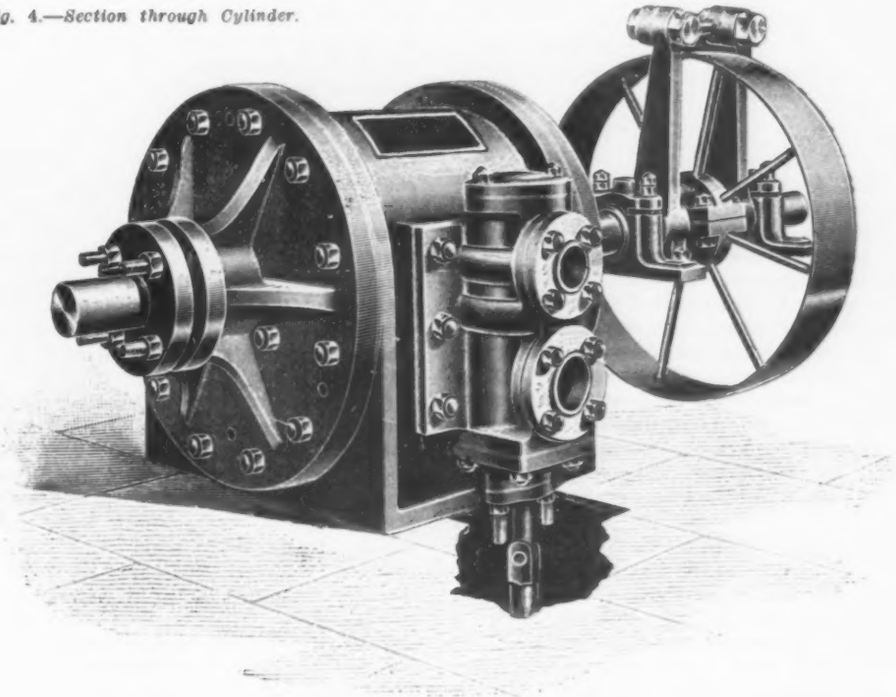


Fig. 5.—Enlarged View of Lifter.

THE MERRILL-BRETT DROP HAMMER LIFTER.

Almost any kind of an overhead support or platform will answer as a support for the lifter, as there is no tendency to rack or sway sidewise, the only strain being the downward pressure equal to the energy necessary to lift the hammer. The lifters can also be placed upon the floor above the drop hammer, on the floor behind the base or at right angles to the slides and above the hammer.

Figs. 2, 3 and 4 show the principal members of the lifter. The shaft, levers (or lifting arms) and piston, Fig. 2, are fastened together to form practically one solid piece. This is the only working part and is free to rotate about three-quarters of a revolution in the cylinder. The cylinder, Fig. 3, is shown with one end cover removed, and it will be seen there is a division piece which is securely bolted to the side. The bearings in which the shaft turns are long, to give ample wearing surface, and are made steam tight by ordinary stuffing boxes. The packing strips are placed in grooves in three sides of the piston blade and in the division piece, and are pressed outward by springs to keep the piston steam tight. The pulley is built of all wrought steel, not fastened to the shaft, and turns freely on the shaft between the two lifting arms. The pulley is thus free from all strains of lifting.

Fig. 4 shows a sectional view of the cylinder, with piston, lifting arms and idler pulley in their respective positions. With the parts as here shown, the hammer would be down and at rest. In order to raise the hammer the steam enters the port A, presses against the piston wing B, and forces the piston to a position, say, at E. When the piston reaches the position E the live steam is cut off and the steam in the cylinder returns through the port A and out to the exhaust; at the same time the piston E returns to the starting point B, this operation being repeated any number of times desired. The lifting arm F is a part of the piston shaft C, consequently when the piston B takes the position E the lifting arm F will take the position K. The lifting strap H is fastened to the two arms by the cross bar G, consequently when F takes the position K the hammer, which is fastened to the strap, will be lifted a certain distance, this distance being varied by the position of the operating levers. D is the division block and L the relief and safety vent. It will be noticed that the loose pulley J is not fastened to the shaft, and therefore serves merely as an idler to change the rotary movement of the strap to a vertical and central lift, consequently giving a uniform movement to the hammer. Lifters can be made to raise hammers to any hight desired by increasing the length of the lifting arms and diameter of the pulley. Fig. 6 shows the lifter with all parts together.

The *Allgemeine Automobil-Zeitung* states that during the German army maneuvers the Emperor used a 16 horse-power Mercèdes motor car. Altogether there were 20 motor cars in use. These were supplied by the firms of Daimler, Benz, Dürkopp, Marienfelde, Adler Opel, and Stoewer, and by the Eisenach Works. For despatches motor bicycles were used, and gave general satisfaction, the types being the Neckarsulm, Cyclon (Erlau), and Progress (Berlin). The bicycles with front driving wheels were found to be the best for soft roads. Ten Daimler motor wagons were used in conjunction with several traction engines by Thorneycroft and by Fowler to bring up the supplies. The special work of the Daimler wagons was to fill two of the maneuver provision magazines. The work performed by them amounted to the carrying of 330 tons a distance of about 40 miles, and this was done in the best possible manner. Experiments were made of attaching a second wagon to the Daimler wagon, and the two together carried a net load of 10 tons at a speed of 6 miles an hour, but this was chiefly over good roads. Cheap spirit was used as fuel for the motor wagons, the cost being not much greater than that of benzine, with the advantage that it was a home made product. None of the motor cars or wagons used had a serious break down in their machinery, although the work performed was very heavy.

Lake Superior Mining Developments.

The Steel Corporation Getting More Ore Property.

DULUTH, MINN., December 20, 1902.—In securing the ore properties of the companies subsidiary to the new Union Steel Company the United States Steel Corporation fortified themselves considerably, but these ore reserves are, of course, very small compared with the Corporation's previous holdings. What is of a great deal more importance in the way of ore holdings is now being closed. By their purchase of the St. Paul & Duluth Railroad, together with its land grant, the Northern Pacific two years ago secured a lot of well located land on the Mesaba range, on which some ore had been found. After the formation of the Northern Securities Company it was impossible for any one to obtain options for the exploration and lease of these lands, as Mr. Hill and the Great Northern were presumed to have first choice. These lands are now under Northern Securities control. The same is true of the lands bought by the Hill interests at the time and since they bought the Duluth, Mississippi River & Northern Railroad. These latter ore lands are not, generally speaking, the property of Northern Securities, but they are controlled by the Hill interests, and have been intended to serve as feeders for Great Northern ore traffic. These lands are of far more value than are those that came to Northern Securities through the Northern Pacific. They include a great deal of ore, much of which is under lease to independent operating companies, and much of which is not yet leased to any one. It is generally supposed that all these lands under consideration contain, all told, several hundred million tons of ore not leased; Mr. Hill puts it at 500,000,000 tons, but he is probably sanguine. The Hill portion of them includes nearly all the ore bearing territory through T. 57 R. 21, west of the holdings now under operation in the northeast corner of the township. What there may be through this town is not known, but is probably very important. There are also lands all through 58-20, 58-19, 58-18 and in 58-17, most of those in the latter township being from the Northern Pacific side.

Whatever there may be in the way of ore on these lands is of minor importance in connection with the general situation, however, in view of this fact—namely, that there is now almost nothing in the way of well located ore bearing lands that is not controlled by some one or another of the concerns already in the field. This is true in a broad sense, not only of the Mesaba range but of the older fields. For while there has been a tremendous activity in exploration on the old ranges for some years very little new ore has been proved, and the field is narrowing for any outsider. Important mines on the Marquette, Menominee, Gogebic and Vermillion ranges that have been found in the last few years, and can be classed as actually new discoveries, can be counted on the fingers of one hand. And the United States Steel Corporation, through their Oliver Iron Mining Company, have been for several months past quite active in taking up by lease, option, or even by purchase, any lands on any range that seemed desirably located and in which the possibility of ore finds was considered fair.

While money will erect blast furnaces and steel mills and secure transportation facilities it will not make ore mines in the Lake region. So that, while the United States Steel Corporation did a great stroke of business when they bought the mills and mines of the new Union Steel Company, they are now doing a far vaster thing and one that will put them much closer to an absolute control of the steel situation of the north than any event that has yet taken place, in getting these Northern Securities lands. I believe, from what can be gathered in this district, that the consummation of this plan is near. No confirmation of this statement can, however, be secured from officers of the companies interested. As it looks here, any such purchase, or rather any such lease, for it is unquestionably a fact that the Great Northern will retain control, so far as traffic and royalties are concerned, will redound to the distinct advantage of every holder of ore lands. It will not only give the United

States Steel Corporation the control indicated above, but will add vastly to their ore reserves for the distant future.

The Crucible Company Purchase Champion Mine.

An interesting recent transaction on the part of the Crucible Steel Company of America is the closing of negotiations for the purchase of Champion mine, Marquette district, which has been accomplished this week. Announcement of the sale is now made for the first time. Champion is one of the oldest mines of the district, and is far better known than its present annual tonnage might suggest. It was opened in 1868, and has been active ever since, with the exception of two years after 1893. At that time the mine looked worked out, and it was proposed that the machinery plant be torn out and operations transferred to the Mesaba. Undoubtedly such a move would have been of tremendous financial advantage, as the management through Walter Fitch has always been wide awake, and nothing but that and money have been needed on the Mesaba to reap vast returns. The Champion produces Bessemer specular and magnetic ores of high grade, has made a total production of about 3,925,000 tons, and is now producing at the rate of 100,000 tons annually. It has, thanks to recent developments in the north and west ends, a large ore reserve and it will be a producer for many years. The mine is more than 1500 feet deep, and has a peculiarity in a spiral shaft, the curve being necessary to enable the shaft to follow the ore measures. The Champion has been owned in Boston, and was one of the very few mines left without furnace and transportation connections.

On the Marquette range a new shaft house is to be erected at Hartford mine by the Oliver Iron Mining Company. It is steel, 126 feet high, with concrete foundations, and is the finest example of shaft building in Marquette county. The American Bridge Company are the constructors. The shaft is 700 feet deep, and underground development is rapidly under way with the plan of making large shipments another season. There are already some 12,000 tons in stock of a high grade Bessemer ore. Section 16 mine of the same company, which has been afire for some days, is now being opened and will resume at once. The fire was far less disastrous than newspaper reports would indicate, and was quickly handled. Old Lucy mine, recently bought by the Cleveland Cliffs Company, is to be reopened at once. It has been idle since 1893. The Breitung Estate will soon take steps to open the brick yard 40 at Negaunee, on which ore has been found. Local parties will explore the Corbett farm, adjoining the new Maas mine of Cleveland Cliffs Company, where they claim ore was cut some time ago.

On the Menominee range Florence mine is preparing for a most active winter, and a large part of its unopened lands will be carefully explored. The mine has made shipment this year of 130,000 tons. No. 4 shaft has been completed and in a month will be in commission. Exploration is in progress at the Binder, north of Hope, Crystal Falls, which is a promising tract.

The Oliver Iron Mining Company are going extensively into the logging business on the Gogebic range, and now have camps at work employing 250 to 300 men. They are exclusively for cutting mining timber for the Norrie group, Atlantic and Aurora. The company will probably cut their own timber on all ranges as soon as they can get around to it, and eliminate contractors' profits. They have just bought for $500,000 a tract of standing pine north of Duluth on the line of what will be their "Ely cut off" when that road is built, and will hold this in reserve for mining timber for Ely and neighboring mines. The tract is estimated at 100,000,000 feet and probably contains more than that. It is all sound, growing timber and will increase quite fast.

Cleveland Cliffs interests have organized the Upper Peninsula Land Company, capital $750,000. The company own 1,000,000 acres of land, and after the Cleveland Cliffs take what they want for hard wood, &c., it will be sold for settlement. Some 200,000 acres will be settled as fast as possible. In a recent conversation Wm. G. Mather, president of the Cleveland Cliffs, dropped the remark that "we are here to stay; the development of a territory as large as a European State is not to be undertaken by those who expect to shortly leave," which is interesting in view of rumors as to the disposition of this company's great holdings on the Marquette range. This company have now begun the making of charcoal at their Marquette plant for their new Pioneer furnace, which is to go into blast about March 1 next. The furnace will consume 225 cords daily, and the carbonizing plant has ample capacity for this. There are 80 80-cord kilns, most of which will be operated.

The ore mines of the Sharon and Union Steel companies will be taken over by the United States Steel Corporation in a few days and will be operated under charge of the latter's present district managers. D. E. W.

Republic Iron & Steel Company Employees to Become Stockholders.

Mention has been made in these columns from time to time of the fact that it was the intention of the Republic Iron & Steel Company of Chicago to allow such of their employees as desired to become stockholders in their corporation. The movement had its inception last summer, a number of employees having organized for the purpose in June, with a membership of 56, since which time the number has been increased to 75, including clerks, stenographers, salesmen, department heads and works managers. Each member is supplied with a pass book, similar to that used by a savings bank, in which he is given credit for each deposit made with the secretary-treasurer, and also with his proportion of the dividend at the end of each quarter earned by the stock which is held by the association. This is considered a better plan than that of giving an individual receipt for each deposit, as it gives each member at all times a complete statement of his account. So far as is possible, the stock is held in escrow in the name of the trustees, but if for any reason a member wishes to withdraw his stock from the association and have it transferred to his own name, the stock which the amounts paid into the association by the member will purchase is issued, the price of the same being the average price of all the stock standing in the name of the trustees. Any balance remaining, insufficient to pay for one share, is refunded in cash. Those desiring to withdraw their stock from the association must give 30 days' notice to the secretary. The officers are elected to serve as long as they remain in the employ of the Republic Iron & Steel Company, and until their successors are appointed.

Some of the provisions are as follows: The trustees shall, at their discretion, be empowered to make all purchases of the preferred stock, said purchases to be made by them in their own names jointly as trustees, but all certificates of stock issued in their names shall be placed by them in escrow with the treasurer of the Republic Iron & Steel Company, and his receipt taken for same, this receipt to be turned over to and remain in the custody of the secretary-treasurer of this association.

Subscriptions to the association shall be paid to the secretary-treasurer in sums of $5 and upward whenever and as often as convenient to the members; each member subscribing at the rate of at least $5 and not more than $25 per month.

All necessary expenses are charged up against the dividends, though charges for transferring stock are borne by the party desiring to withdraw.

Before the Cleveland Institution of Engineers of Middlesbrough, England, a paper on "The Use of Blast Furnace Gas in Gas Engines" was read by Cecil A. Cochrane of Cochrane & Co., Limited, Ormesby Iron Works, Middlesbrough. It detailed the results obtained with a Cockerill engine.

Hugh W. Harrison has retired from the presidency of the Harrison Machine Works, Belleville, Ill., on account of ill health, and has been succeeded by Cyrus Thompson.

Blast Furnace Gas Engines and Their Work.*—IV.

The Koerting Double Acting Two-Cycle Motor.

The latest in the field of the gas engine is the double acting two cycle motor, which was put in operation in the beginning of the present year, after the firm had quietly tested a motor at their works in the most thorough manner. So far as I know these engines have met all expectations. At the Düsseldorf Exposition the design was represented by two first-class machine shops, Gebrueder Klein of Dahlbruch, and by the Siegener M. A. G. Both of the engines were in operation daily, the former being used for driving a rolling mill train, while the latter was employed in operating a blowing engine. As will be seen from the accompanying engravings, Figs. 19 to 22, inclusive, the piston has a length about equal to the stroke of the engine, while the working cylinder has somewhat more than double its length, and that it and its jacket are cast in one piece. At both ends of the working cylinder a simple head is secured which, in a special box, carries the inlet valves, which are operated by cams from the valve shaft. Beside this valve there is attached to the cylinder head only the small valve for starting the engine with compressed air. The motor has no exhaust valves, the gases of combustion escaping as they do in the case of the Oechelhaeuser engine. The working piston when it occupies the end of the stroke uncovers a series of ports through which the gases may escape during a certain arc of the crank travel. The valve has two annular openings which continue as two separate pipes, one of which goes to a gas pump, and the other leads to an air pump, as is closely shown in Fig. 19. The auxiliary pumps, which are necessary to supply the mixture of gas and air, have been located by Koerting alongside of the working cylinder. They are driven by a crank which is 110 degrees in advance of the working crank and are operated by one rod. They have simple piston valves so arranged that the rear part of the gas pump and the rear part of the air pump deliver only to the rear end of the working cylinder through the separate pipes. In order to explain the method of operation of the working cylinder we will assume that the piston occupies the rear end of the cylinder at the beginning of the expansion stroke. After the edge of the piston has reached the exhaust port the work of exhausting begins. The pressure of the gases of combustion rapidly drops to atmospheric pressure and soon afterwards the inlet valve opens even before the dead center has been reached. As will be noted further on, the arrangement of the charging pumps is so made that at this moment air alone is first delivered. This expels the gases of combustion, cools the cylinder and forms a separating layer between the gases of combustion and the fresh mixture, which enters in the next moment, the delivery of gas having also begun. The dimensions of the two pump pistons bear such proportion that the correct mixture is delivered into the working cylinder corresponding to the character of the gas in use. After the inlet valve has been closed the contents of the working cylinder are compressed to about ten atmospheres. Then, at the dead center, two electric igniting devices start the combustion and the compression begins anew. It should be noted that owing to the peculiar form of the compression space Koerting claims to secure the much discussed layers of air and mixture. This would prevent the diffusion of a correct mixture of air and gas with an excess of air in the case of light loads or when running without a load. According to this the engine would always secure a good mixture at the time of ignition and would therefore secure certainty of ignition and regularity of compressions even under a light load. From Fig. 15 it will be observed that the gas pump is located toward the rear, while the air pump is placed forward. Through the aid of the valves *p*, *p*, the ports *b*, *b*, are connected with the gas supply pipes *c*, *c*, during the suction stroke, while during the compression they are connected with the pressure line K*g*. The same is true of the air cylinder and its supply pipe and the pressure line K*l*. The pipe connections have been so arranged that their total contents are equal for each side of the cylinder.

The gas pump is supplied with two throttle valves, *f*, *f*, so placed that when opened they connect the cylinder port *b*, *b* with the pressure pipe K*g*. To begin with, however, let us assume these valves to be closed. The air cylinder is so operated that the piston valve cuts off the air cylinder from the air supply at once after the end of the suction stroke, and immediately after-

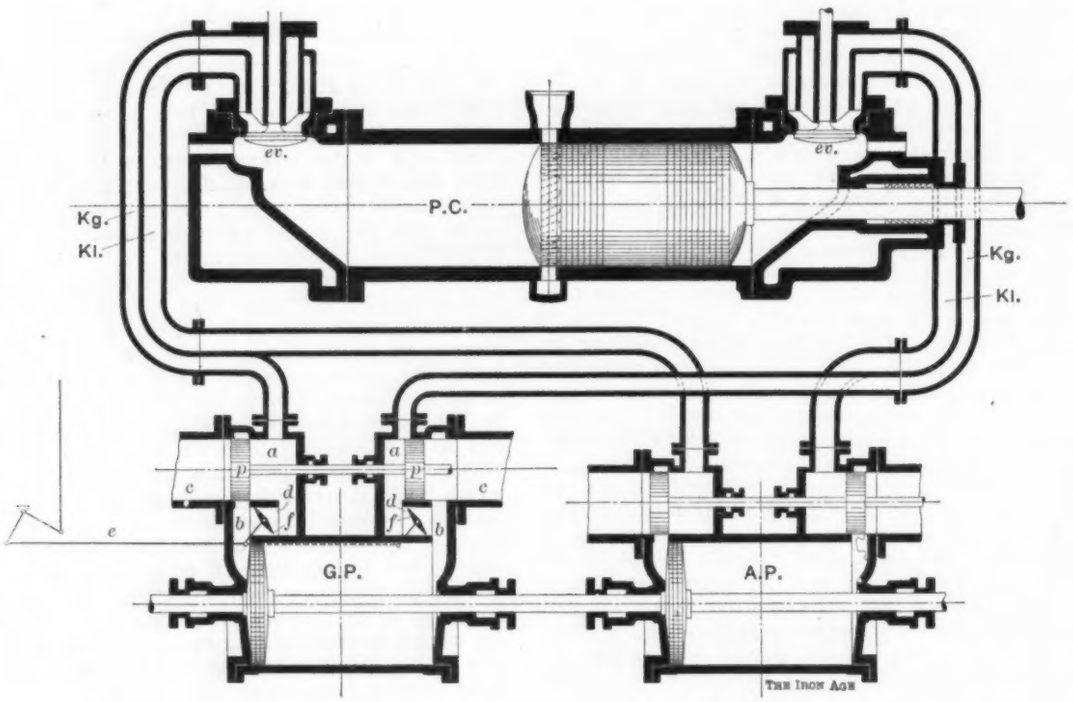


Fig. 19.—Plan Showing Method of Working of Double Acting Two-Cycle Koerting Gas Engine.

* Abstract of paper read before the Verein Deutscher Eisenhuettenleute by Direktor Reinhardt of Dortmund, Germany. Continued from *The Iron Age*, December 4, page 28, December 11, page 12, and December 18, page 22.

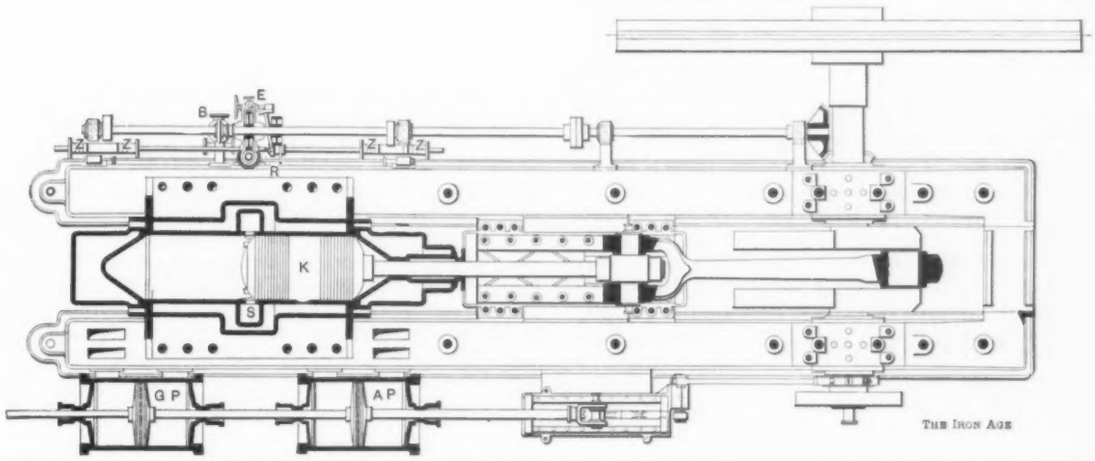
wards connects it with the pressure line. When, therefore, the piston makes its return stroke, compression is brought about in the pipe until the inlet valve of the working cylinder is opened.

Since the pump crank is 110 degrees in advance, this takes place at the moment when the pump piston is about at the middle of the stroke. The gas cylinder, however, works in such a manner that the valve keeps the cylinder connected with the exhaust during the whole of the exhaust stroke and about during one-half of the return stroke. It is only then that the valve cuts off the supply and soon afterwards opens the pressure pipe. So far as the gas is concerned, its compression begins only when the inlet valve is opened. When the inlet valve has just been closed then gas and air are in their pipes above the inlet valve.

For the next period the forward end of the air pressure port on the left side is connected with the air pump cylinder at atmospheric pressure, the air pump piston occupying the position at dead center. At this moment, therefore, the mixture has a pressure which reduces the pressure in the air port. The result of this is that the gas which is at the time cut off from the gas pump cylinder expands through the valve from the gas port into the air port, but the pressure grows so rapidly that the former pressure is already reached before the pump piston arrives at its center position. Therefore the gas first occupies its former position and is forced back a distance into its own port before the inlet valve is opened. The gas pump only begins to deliver at this time; that is to say, when the gas pressure port is opened a pressure of the mixture first develops which is less than the pressure in the port, and therefore at first brings about a further receding of the gas from the valve. For this reason we have from this point an equal pressure in the air cylinder, and in the two supply ports. When the air and gas pistons continue their travel air and gas are delivered in the proportion of the piston area into the ports, so that when the inlet valve is opened air alone enters at first, the gas having been crowded back, and then air and gas are delivered into the working cylinder in the proportions desired. The formation of the mixture, therefore, begins only directly at the inlet valve and is almost independent of the pressure in the gas supply pipe and of possible fluctuations.

This method of supplying the working cylinder applies to the maximum work of the engine, for which the total quantity of gas drawn in by the engine or about one-half of the gas pump cylinder contents are forced into the working cylinder. When the load changes the governor must serve a device through which the time of admission of gas into the working cylinder is changed. Theoretically this would be best attained if the time of beginning the delivery by the gas pump were altered, and that, therefore, the piston valve of the gas pump cylinder should close later the connection with the gas supply pipe.

The first engines were so designed that the governor acted upon the piston valves. This, however, involved so much friction that it was changed as shown in the sketch. Whenever the throttle valves *f f* between the



K.—Piston in working cylinder. S.—Exhaust Ports. G P.—Gas pump. A P.—Air pump. E.—Adjustment device for igniter. B.—Valve for admission of compressed air for starting engine.

Fig. 20.—Horizontal Section.

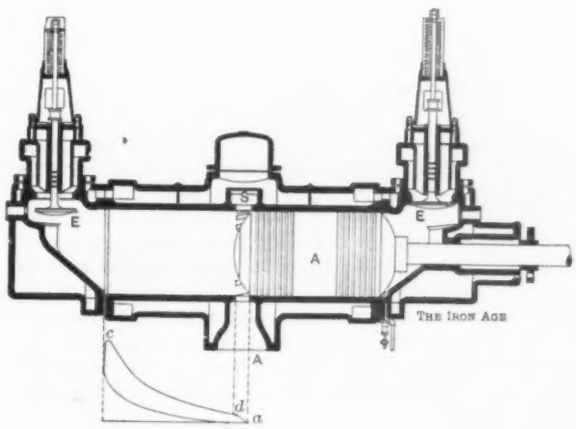


Fig. 21.—Longitudinal Section through Working Cylinder.

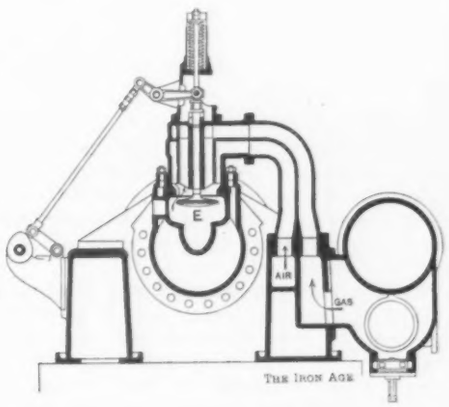


Fig. 22.—Cross Section through Admission Valve.

KOERTING DOUBLE ACTING TWO-CYCLE GAS ENGINE.

gas cylinder and the gas supply pipe are not completely closed the gas pump is in constant connection with the gas pressure pipe line. In this line there is a pressure of 0.5 to 0.6 atmosphere, and this pressure brings about that during the suction stroke of the gas pump piston and during the unchanged part of the return stroke gas escapes from the line into the cylinder and thence into the gas supply main. In this arrangement the gas does not expand into the air port at the end of the suction stroke in the air cylinder as before and is only subsequently forced back, but the gas at once recedes from the inlet valve and makes room for air by the back flow even before the beginning of the suction stroke. It is only when the piston valve has closed the gas supply and delivery begins that the back flow stops and that the gas is again forced forward in the port, whereby the direction of the current changes in the throttle valve *f*. It depends, therefore, upon the position of the valves, as determined by the governor, whether more or less gas flows back out of the port and whether gas mixes with the air flowing in through the inlet valve at an earlier or at a later period. The throttle valve is not designed as shown in the engraving, but is a counterbalanced valve. Particularly when producer gas is being employed it will be necessary to clean it very frequently.

Under this new arrangement the governing is very simple and is likely to meet all requirements. Of course it implies a loss of energy, because the quantity of gas flowing back with every stroke is uselessly compressed. If this delivery by layers is correct, it is a question of regulating by quantity, provided that no diffusion of the mixture with the gases or air on the opposite side occurs during the period of compression. The compression is influenced by the governing, though not to a very pronounced degree, since the same quantity of air is always employed.

From the above description the conclusion seems justified that about one-half of the air cylinder contents is employed in every stroke to blow out the gases of combustion or to form an air layer back of the piston. The mechanical efficiency of this engine, therefore, since the pumps must deliver gas and air under a pressure of about 1.6 atmospheres, must be lower than it is in the case of a four-cycle engine. I have no data on this point, but the Koerting motor and the blowing engine connected with it at the Nieder-Rheinische Huette have been tested for some time by Professor Meyer, so that we shall probably soon have information on this point.

The claim is made that the indicated work of the pumps is unduly high in the Koerting engine. As stated, it is said to 6 to 7 per cent. of the indicated work of the working cylinder in the Oechselhaeuser motor, and I see no reason why it should not be brought down to a similarly low figure in the case of the Koerting. If this work is really much greater with the Koerting it may be due to the fact that too large a quantity of air is used, that perhaps too high a pressure is necessary in the pumps, because the sections of the ports and of the inlet valve are relatively too small, and that the immediate opening of the pressure ports at the beginning of the compression calls for excessive work. Poor mechanical efficiency would above all influence the consumption of gas per hour per effective horse-power and also the dimensions and the price of the engine. At the present time a minimum consumption of gas does not play an important part in blast furnace gas engines, so that it is only a question to decide whether the other advantages of the engine are not paid for too dearly.

In judging of this double acting engine the following should be taken into consideration, besides the method of forming the mixture and the inner cooling by a fresh supply of air for the expulsion of the gases of combustion: At each end of the working cylinder there is only one valve, and that is the inlet valve, which is cooled by the inflowing mixture and therefore causes no trouble. Besides, this valve does not work against a pressure, but in opening it meets the atmospheric pressure in the working cylinder. There is no exhaust valve which must be cooled with water, as in the larger four-cycle engines, and which puts a heavy strain upon the governor shaft. While the latter makes the same number of revolutions as the crank shaft, as compared with one-half the number of revolutions in the four-cycle engines, it is a fact that it is only under light loads and runs more quietly than it does in the case of the four-cycle engines. The cylinder head with its one valve is smaller. It can be cooled more effectively and therefore is safer so far as durability is concerned.

The temperature of the working cylinder remains low, owing to the water jacket and owing to the fact that it is in contact with the very long water cooled piston. According to Koerting the temperature is similar to that of a steam engine. This makes lubrication a simple matter. The cylinder is exposed to high temperatures only at its ends and for a short distance. The parts in the vicinity of the exhaust ports do not seem to me dangerous, because these ports are almost continuously covered by the long piston and are cooled with it. The deposit of dirt in these ports is said to be small, because the blowing out is not effected in one direction, but alternately in both. When the piston is at the dead center point, therefore when there is the highest pressure on one side, all the 14 piston rings are effective. Therefore there does not seem to be any danger of leakage.

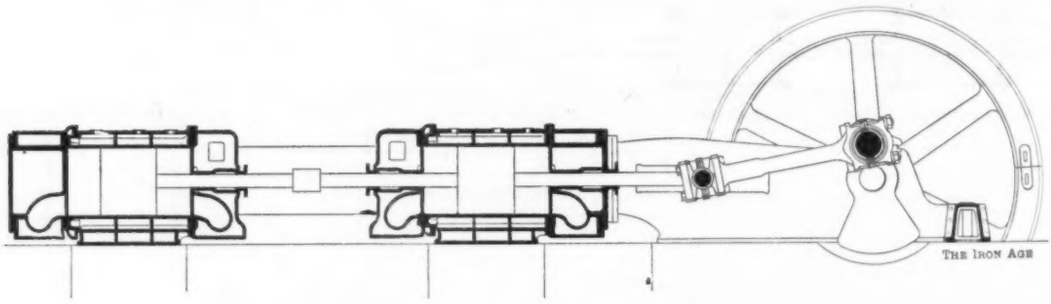


Fig. 23.—Double Acting Tandem Cockerill 2500 Horse-power Gas Engine.

The engine works at once, even in starting, with about 10 atmospheres pressure, and when the compressed air for starting is somewhat lower in pressure no air can enter even when the starting valve is open, and thus spoil the mixture as soon as it is once in the cylinder. Therefore the starting does not require special attention. It is worthy of note that blowing off valves are arranged for the Koerting engine through which excess oil and dirt may be blown out while the engine is running. Besides the drawback of possible lower mechanical efficiency the point may be raised against this engine that any leakage or corrosion of the piston can only be observed later than in the case of the open four-cycle engine; that stuffing boxes are necessary, and that the removal of the piston is more difficult and takes more time, because one cylinder head and a part of the gear must be removed for this purpose. I do not doubt, however, that Koerting will soon improve his design in this respect, as soon as the Deutz and Cockerill people have built their four-cycle engines, shown thus far only in drawings, which do not have this drawback.

Cockerill.

Fig. 23 shows on a somewhat small scale and in rather a bare manner the double acting tandem four-

cycle 2500 horse-power gas engine of Cockerill in Seraing. The cylinders consist of outer jackets and specially inserted boxes. The ribs of the jacket and of the cylinder rest against one another in such a way that three separate streams of water are supplied and that, therefore, the cooling of the cylinders must be very uniform and very effective. At the end of each cylinder a cylinder head is screwed on. The piston of the forward cylinder is taken out in front, while that of the rear cylinder is extracted from the rear. The result of this is that the front end of the forward cylinder and the rear head of the rear cylinder have covers, the diameter of which is somewhat larger than that of the cylinder itself. The question is whether these long covers will not burn so tight that they will be difficult to remove. The guides are placed in the frame, so that the forward cylinder cover and the piston are readily accessible. Both of the inner cylinder heads are without cover and are made in one piece. The flanges of the cylinder heads are not kept as cool as they were in the old design. The valves lie low down. Both cylinders are connected with the frame. Unfortunately, nothing beyond this can be judged from the drawing.

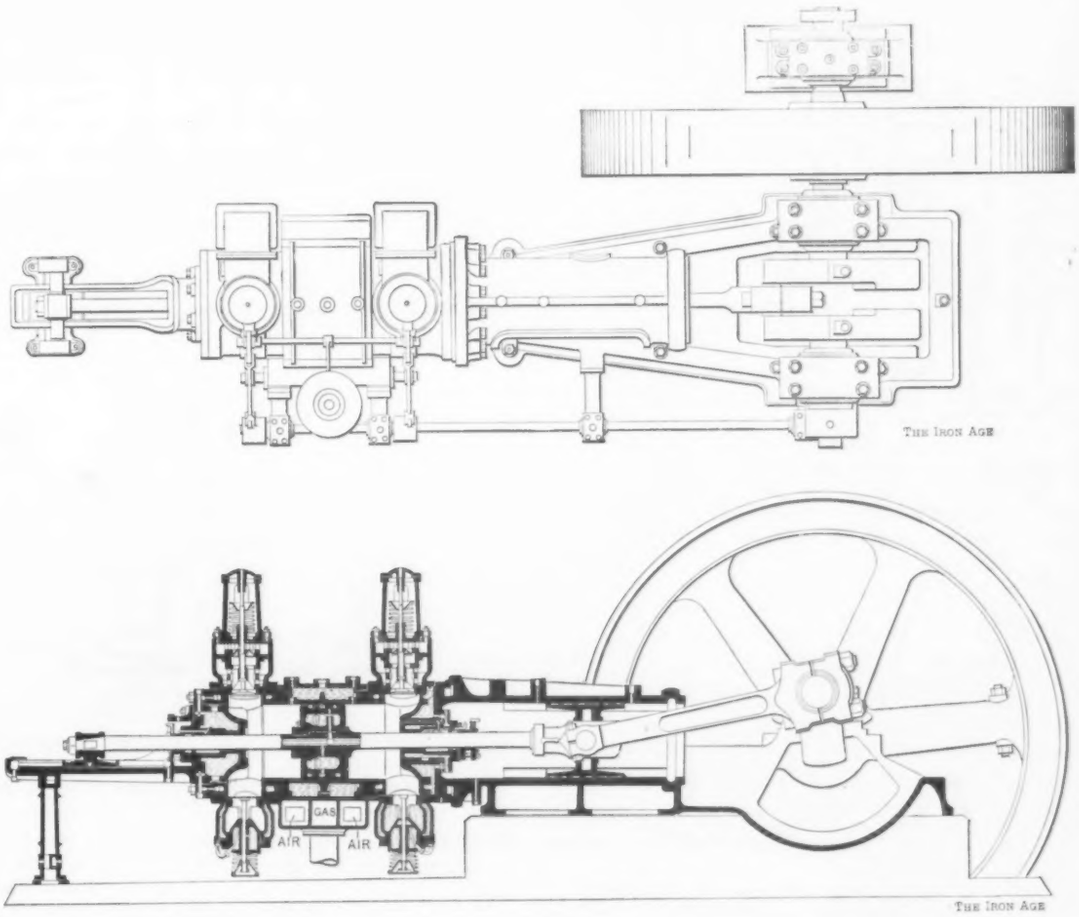


Fig. 24.—Plan and Vertical Section.

DEUTZ DOUBLE ACTING FOUR-CYCLE GAS ENGINE.

Deutz Double Acting Four-Cycle Engine.

The drawings, Figs. 24-27, of the Deutz four-cycle double acting gas engine show the guides clearly, and so far as its valve motion is concerned, it is very similar to that of a steam engine. At each end of the cylinder an inlet (mixing) valve is combined on one spindle with a gas valve and air valve. The exhaust valve is placed very low. The inlet valve boxes are safe, while the exhaust valve box is practically and effectively cooled, being a difficult part. The piston is water cooled. According to my idea, it should be longer and have a larger number of piston rings. After removing the back guide and a flat cover it can be taken out without touching the valve gear. An effort has been made, as is shown in Fig. 25, to relieve the pressure on the valve shaft during the lifting of the exhaust valve by the use of compressed air at the proper moment. This is also indicated in Figs. 26 and 27.

As compared with the ordinary four-cycle engines these double acting motors have the advantage of greater regularity in running and of small size for equal power. Compared with the double acting two-cycle motors they are larger in their dimensions, have a less uniformity of running, but a higher mechanical efficiency. Besides this there is the disadvantage that exhaust valves are necessary and that these lie below the piston rod. I desire to point out that all the modern gears depending upon regulating by quantity and by changeable compression possess the drawback that the valve mechanism does not operate quietly when the engine is under light load or under no load at all.

It will be observed that there is a very much larger selection of gas engine systems than ever before, and that it will become even more difficult to reach a decision in the near future. The main question which obtrudes itself is, which system is most satisfactory? Unfortunately this question cannot be answered off hand. It depends above all things upon the size of the engine, the purpose to which it is put and the price to be paid. The consumption of gas will probably not play that part which it does when running with producer gas, in which fuel causes direct outlays. Besides, it is only a question of differences of 10 to 20 per cent. So far as the modern valve gears are concerned, experience is either inadequate or is lacking altogether. The consumption of oil has been much reduced in the large engines. Many of the figures submitted to me seem so low that I hesitate to reproduce them. The consump-

tion of cooling water for the engine alone is given at 40 to 80 liters per hour per horse-power.

An answer to the question propounded can only be very general in its character, and according to my sincere conviction I will answer it as follows: For smaller engines, from about 300 to 400 horse-power, I would give the preference to the open double acting four-cycle engine, provided it has adequate guides and a cylinder head design proven by prolonged practical experience. As it seems to me, the cylinder heads on an average have not proven absolutely safe in practice with the larger cylinders. Besides this, there is the disadvantage of the large exhaust valve and the strains upon the valve shaft in lifting the valve. For larger powers, therefore, those designs seem to me most suitable which possess the smallest dimensions as to cylinder heads and valves. This is the case with the double acting four-cycle engines and with two-cycle engines with or without cylinder heads. For very large powers, about 1000 horse-power in one cylinder, I would choose to-day only those engines which have no exhaust valve; in other words, two-cycle engines.

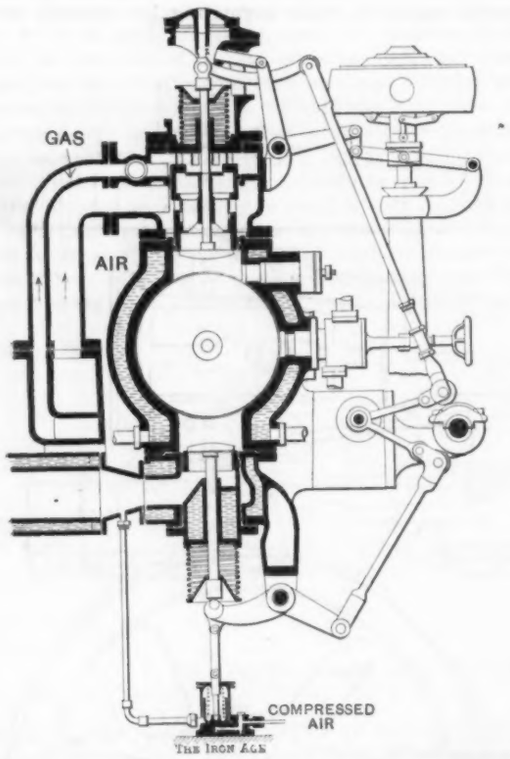


Fig. 25.—Section through Cylinder Head.

The Baltimore Rolling Mill Company.

The Baltimore Rolling Mill Company, 604 Continental Trust Building, Baltimore, Md., expect to have their entire plant at Canton completed and in operation by the last of January. The puddle mill is now ready to operate, but owing to the scarcity and high price of coal it has not yet been started. Arrangements have been made, however, to start this department shortly after the first of the year.

The main building, the erection of which was begun in June, is 162 x 452 feet, and will contain one 10-inch and one 18-inch train for finished iron and a complete puddling department, consisting of an 18-inch train of rolls and eight double puddling furnaces with an annual capacity of from 800 to 900 tons of muck bars. The product will be bar iron and the capacity about 25,000 tons annually.

Regarding equipment the company write us that they are in the market for 10 and 18 inch mills, an engine about 30 x 36 to drive the 10-inch train, and a full line of shears for scrap and to shear the finished iron. The machinery already secured consists of an 18-inch train of rolls from Wickes Brothers, Pittsburgh; water tube boilers from Hyde Bros. & Co., Pittsburgh, those over the puddling furnaces being 125 horse-power and those over the heating furnaces 150 horse-power; 28 x 48 piston valve bar mill engine from Pusey & James Company, Wilmington, Del., and a George H. Corliss 26 x 48 engine to drive the puddle mill.

The officers are Harry Wehr, president, and John C. Brown, vice-president and treasurer.

An Electrical Merger in Germany.

Dispatches from Berlin announce that the Allgemeine Elektricitaets Gesellschaft, with $22,125,000 capital in bonds, and the Union Elektricitaets Gesellschaft, having $85,000,000 capital, have reached an agreement amounting to a practical consolidation, the directors of each company being elected members of the board of the other, so that the management is identical, though the companies nominally remain separate.

The step is the result of the crisis in the German electrical industry. After the subsidence of the great boom in electrical companies it was found that the manufacturing capacity had far outrun the market's demands, hence various efforts had already been made to organize a combination after the method practiced in America. The Allgemeine took the lead in this effort, but in early negotiations found that most of the other companies demanded too high a rating in the proposed combination. The first offer was made to the Schuckert Company of Nuremberg, which surprised the country last summer by announcing sensational losses through the shrinkage in value of its securities and plant.

The Allgemeine attempted to secure control of the Schuckert business through a group of great Berlin banks which backed the Allgemeine. The banks contemplated effecting a practical combination of the two companies by extending financial support to the Schuckert. The negotiations came to nothing through the refusal of the Schuckert directors to accept the terms offered. The Union owns the Thomson-Houston patents for Germany and neighboring countries. The technical manager of the combination is an American, Mr. Magee.

The combination's greatest rival, the Siemens & Halske Company, capitalized at $23,250,000, held its annual meeting to-day and declared a 4 per cent. dividend, against 8 per cent. in 1901. The company's

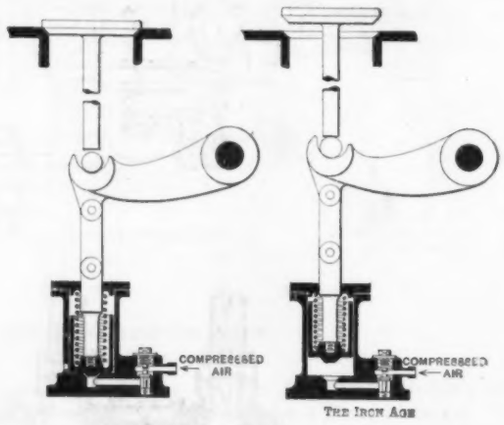


Fig. 26.—Position of Valve Closed.

Fig. 27.—Position of Valve Open.

Figs. 26 and 27.—Device for Relieving Exhaust Valve.

DEUTZ FOUR-CYCLE DOUBLE ACTING GAS ENGINE.

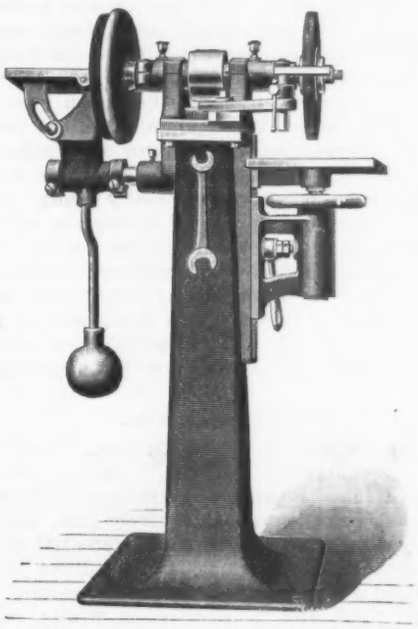
report says of the combination that the Siemens & Halske Company are able to go on alone, but after the situation has cleared up a combination may seem feasible.

The Rowbottom Grinder.

The Rowbottom Machine Company of Waterbury, Conn., have designed a new grinder embodying several features of interest.

The emery wheel on the right is provided with a rest for tool grinding; also with a counterbalanced table for surface work. The table can be adjusted very quickly for wide ranges by lifting the lever, which releases the bracket, allowing the table to be set to the approximate position. Pushing the lever down fastens the bracket rigidly to the column when the hand wheel under the table is then used for fine feed up or down.

The emery wheel on the left is securely fastened into a flanged disk, and the table swings across the face, thus using the full face of the wheel, which is kept true. The



THE ROWBOTTOM GRINDER.

swinging table is adjustable toward the face of the wheel as it wears down and will also adjust on an angle for angular work.

When desired emery cloth disks, with a press, are provided for doing light grinding or polishing. These disks interchange with the emery wheel on left of the machine. The bearings are of babbitt metal, made long and dust proof and provided with adjustment for taking up wear. The emery wheels are 10 inches in diameter, the disks 12 inches and the horizontal table 10 x 16 inches with a vertical adjustment of 8 inches.

Suits for the alleged infringement of the Brislin-Vinnac patents for operating rolling mill feed tables were commenced at Pittsburgh, Pa., last week against A. & P. Roberts Company, operating the Pencoyd Iron Works at Philadelphia, Pa.; the Phoenix Iron Company, Phoenixville, Pa., and the Passaic Rolling Mill Company, Paterson, N. J.

Since the purchase of the properties of the new Union Steel Company, at Sharon and Donora, Pa., by the United States Steel Corporation, reports have been printed that it was the intention of the Steel Corporation to take over the holdings of the Republic Iron & Steel Company. We can state officially that these reports are entirely untrue. It is possible, however, that the Steel Corporation may take over one or two other large steel properties after the first of the year.

Solidified Crude Oil Fuel.

The *Railroad Gazette* describes a demonstration of some of the characteristics possessed by a new kind of fuel which was given before an audience composed largely of members of the Western Society of Engineers in Chicago. This fuel was formed from Beaumont, Texas, crude oil by a patented process, and was exhibited in briquette form. The inventor, Austyn Granville, explained the method of production, the conditions under which it may be used advantageously, the cost of the fuel, and other points of interest in connection with it.

This is, of course, not by any means the first time that petroleum has been solidified, with the object of using the resulting product as fuel. But some of the previous substances have been of such a character that their combustion was attended with objectionable features, making their use impracticable; while with others the process of production has been so expensive as to make the cost practically prohibitory. It is claimed for the Granville product that not only is it produced cheaply, but that it contains all of the constituents of the oil, with the exception of a small volume of the inflammable gases which escape during the solidifying process.

The heat value of Beaumont oil has been given as ranging from 17,000 to over 20,000 B. T. U., with 18,500 as an average. The oil from which these briquettes are made has the highest of the heat values given above. During the process of solidifying the sulphur is eliminated and this, together with the escape of the gaseous constituents as mentioned, reduces this heat value to something like 18,000 B. T. U. The briquettes burn with a strong, hot flame, from the upper surface downward, leaving practically no residuum, that for the all petroleum form being one-eighth of 1 per cent., it is said. Other constituents such as coal dust, sawdust, refuse from oil refineries and numerous other substances may enter into the composition of the briquettes in any desired proportion, one result of which, however, is a reduction of heat value for the substance. For a great many purposes this is desirable because of the intense heat from the purely petroleum bricks.

Advantages are claimed for the fuel over both coal and liquid petroleum. To burn the latter, boilers must be especially equipped with suitable apparatus; also special facilities for transporting and storing the oil must be provided. There are objections to storing oil in large quantities, chief of which is the danger in case of fire; under many circumstances such storage is not permissible at all. The solidified petroleum will not ignite unless a flame comes in contact with it; also it is claimed that there is no danger from spontaneous combustion.

In comparison with coal, one important consideration is the higher calorific power of the oil fuel. This is of especial importance for vessels, where it would mean increased mileage on a given bunker capacity. The briquettes occupy practically the same space as coal, weight for weight. Another point is its ability to produce steam quickly.

The preferable way for burning the fuel is on a chain grate, the briquettes being fed in uniformly at the front. Air should be admitted over the fire, none whatever coming through the grates. It may be burned in locomotives with but few changes, finer grates being necessary to support the fused mass; also provision for admitting the air at the front of the fire box must be made.

A plant having a capacity of 1000 tons a day is being built at Port Arthur, Texas, which has a deep water harbor. Another plant of equal capacity is being built at San Raphael, opposite San Francisco, Cal. These plants may easily be increased to have a capacity of 5000 tons a day.

The cost of manufacture depends upon the price of oil and of labor in any particular locality. In the Texas field the fuel can be delivered at tide water at a cost of production of $1.20 per ton. This is doubtless cheaper than it can be produced elsewhere because of the very low price of the oil.

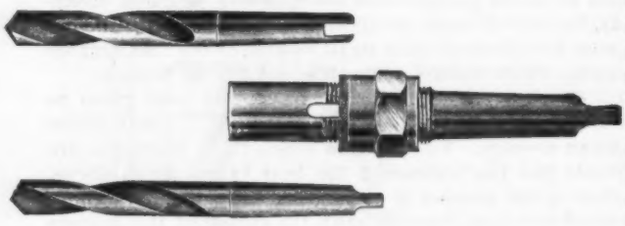
The substance is an active absorbent of water and for that reason the briquettes are provided with an

anhydrous coating for protection against moisture. It is possible to compress the substance to several times its normal density, and it is claimed that the time of consumption is increased in the same ratio as the density; this would increase storage capacity.

The Standard Petroleum Briquette Company, capital $2,500,000, have been formed to make the fuel. The headquarters are in the Unity Building, Chicago.

The Improved Drill Socket.

The drill socket manufactured by the Improved Socket & Chuck Company of Braddock, Pa., brings into use a new method of driving drills and using drills when the tongues have been broken off, twisted or bent. The new system merely mills a slot into the shank, as shown in the upper view. With the old way the broken drill must be annealed, fitted to the socket and reharded, with the risk of not getting the right temper, or drawing it out of true, &c. The socket has a hexagon shell with a universal key, and is so designed that by screwing the shell downward the drill is removed from the socket, and by screwing the shell upward the socket is released from the drill press without drifting or hammering.



THE IMPROVED DRILL SOCKET.

New Freight Rates on Coke.

Taking effect January 1, 1903, freight rates on coke from the Connellsville region will be advanced about 10 per cent. The new rates from the region to points named below, in tons of 2000 pounds, will be as follows:

Akron, Ohio	$1.50	Mansfield, Ohio	2.00
Alton, Ill.	2.80	Marion, Ohio	2.00
Anderson, Ind.	2.35	Meadville, Pa.	1.60
Barberton, Ohio.	1.50	Muncie, Ind.	2.35
Belleville, Ill.	2.80	Springfield, Ohio.	2.00
Bradford, Pa.	1.85	Terre Haute, Ind.	2.65
Cairo, Ill.	3.30	Youngstown, Ohio	1.30
Canton, Ohio.	1.40	Sharpsville, Pa.	1.30
Chicago, Ill.	2.65	New Castle, Pa.	1.30
Cincinnati, Ohio.	2.10	Sharon, Pa.	1.30
Cleveland, Ohio.	1.60	Struthers, Ohio.	1.30
Columbus, Ohio.	1.65	Wheatland, Pa.	1.30
Connersville, Ind.	2.35	Brier Hill, Ohio	1.30
Corey, Pa.	1.60	Girard, Ohio	1.30
Crawfordsville, Ind.	2.70	Niles, Ohio.	1.30
Dayton, Ohio.	2.00	Hubbard, Ohio	1.30
East St. Louis, Ill.	2.80	Beaver Falls, Pa.	1.20
Franklin, Pa.	1.60	New Brighton, Pa.	1.20
Indianapolis, Ind.	2.35	Aliquippa, Pa.	1.20
Kenton, Ohio.	2.25	Ellwood City, Pa.	1.20
Louisville, Ky.	2.65	Lowellville, Ohio	1.20

Snare & Triest, contracting engineers, 39 Cortlandt street, New York, have incorporated with a capital of $600,000, for the purpose of increasing their facilities for handling their growing business. The officers and directors are Frederick Snare, president; W. S. Triest, vice-president, and H. M. Dunn, secretary and treasurer.

Brown & Wales, 69 Purchase street, Boston, Mass., have bought the tool steel business of Bernard Gridley Company of Boston, and have taken the agency for the United States and Canada of the well-known tool steels manufactured by Leadbeater & Scott of Sheffield, England.

The British Inquiry Into Subsidies.

LONDON, December 13, 1902.—The report of the Select Committee on Subsidies of Parliament, which has been looked forward to with a great deal of interest and curiosity, is now complete. The committee have unanimously agreed to its contents, and there is no minority report. The recommendations of this committee, therefore, carry at least the weight of unanimity, but I may add that with the exception of Sir Edward Sassoon and Sir Edgar Vincent the gentlemen comprising the committee do not carry great weight either in the political or commercial world.

The Meaning of Subsidy.

I am not surprised that the first point attacked by the committee was to define clearly the meaning of "subsidy." Bounty, subsidy, subvention all denote pecuniary aid, and are substantially interchangeable. The word "bounty," however, is generally intended to mean a payment made to encourage some branch of industry, trade or agriculture. The word "subsidy" really has the same meaning, but is generally employed to describe a payment made for value alleged to be fully received, as, for example, a postal subsidy. The word "subvention" is generally used in connection with payments made by the Admiralty to secure lien upon mercantile ships in time of war. The committee tell us that, in point of fact, "bounties, subsidies or subventions are all terms used for payments made for some kind of value received irrespective of the policy which may be involved." It may be the case of carriage of mails, or the provision of cable communication, or the maintenance of national defense, or it may be the encouragement of trade. The fact remains, it is difficult to analyze the word into its component parts and lay down that so much is paid as a postal subsidy, so much for Admiralty purposes, or so much for the encouragement of trade.

Scope of the Inquiry.

The committee take up British, German, French, Russian, Austro-Hungarian, Italian, Dutch, Swedish, Norwegian, Danish, Belgian and Japanese subsidies to shipping, and enter quite exhaustively into their details. They also consider German preferential railway rates, as these are equivalent to an indirect bounty. The conditions attached to subsidies in the several countries are set forth, also the restrictions, if any, relative to the sale of subsidized ships into foreign control. They further inquire into rates of freight on subsidized vessels and the effects of subsidies on British trade. They state that in general it may be said that British shipping hold its own, notwithstanding all its handicaps.

It is none the less true that British manufacturers have been displaced by their foreign competitors in many parts of the world, and evidence was forthcoming that this was in a large degree due to freight rates, which are unfavorable to the British manufacturer. I need not quote from the evidence to any extent. One concrete case will suffice; it is found in the evidence of Sir Alexander Swettenham, and relates to the Straits Settlements. The Singapore region, he says, "has been developing very largely in the last 20 years, and there has been an enormous increase of trade all round:" but in looking at statistics he thinks it will be found "that we were the very first in the field, and we have had all our agencies established, and we had a very large amount of shipping in our possession; and other things being equal, certainly we ought to have developed at the same rate as others, if not faster; because being on the spot, and having everything going like clock work, it would have been easier for us to have increased our trade than for others who were not on the spot. What we find is that the foreigners, or certain foreigners" (he will not say all of them), "notably the Germans and Japanese, have increased their trade very much more rapidly and very much more efficiently than we have." Singapore and the Straits Settlements are one of our most important colonies, and imperial communication and trade with them are correspondingly important. Sir Alexander goes on to point out that these nations

"who have this large increase of trade have also at the same time been receiving a large accession of subsidy," and "they have got a much greater share than we have got of the increase" of trade. If this increase is not largely due to the accession of subsidy, he says it can only be accounted for by attributing "general stupidity to the English and general cleverness to the Germans." This is good evidence, pointing conclusively to the fact that foreign subsidized companies, whose rates of freights are controlled by Government, carry on their operations with marked advantage.

Conclusions and Recommendations.

The conclusions and recommendations of the committee are as follows:

1. That the granting of shipping subsidies at considerable pecuniary cost by foreign governments has favored the development of competition against British shipowners and trade upon the principal routes of ocean communication, and assisted in the transfer from British to Continental ports of some branches of foreign and colonial trade; but that, notwithstanding the fostering effect of subsidies upon foreign competition, British steam shipping and trade have in the main held their own, and under fair conditions British shipowners are able to maintain the maritime commerce of the country.

2. That subsidies are the minor factor, and commercial skill and industry the major factors, of the recent development of the shipping and trade of certain foreign countries, and notably of Germany, where, for example, the granting of through bills of lading via the State railways has had an important effect. In some other countries subsidies have led to no satisfactory results.

3. That the susidies given by foreign governments to selected lines or owners tend to restrict free competition and so to facilitate the establishment of federations and shipping rings, and therefore that no subsidy should be granted without Government control over maximum rates of freight and over this combination of subsidized with unsubsidized owners to restrict competition.

4. That the competition of British ship owners with their commercial rivals upon fair conditions, without Government interference by way of subsidies or by way of control of freights, is more healthy and likely to be more beneficial to the nation and empire than a State subsidized and State controlled system under which the ship owner would have to depend less upon his individual energy and skill and more upon the favor and support of the Government.

5. That a general system of subsidies other than for services rendered is costly and inexpedient.

6. That rare cases occur where in view of special imperial considerations subsidies are necessary for establishing fast direct British communication and that at the present moment such a subsidy should be favorably considered for a line to East Africa, where there is no direct British steamship service, and where British trade is handicapped by foreign subsidized steamship lines.

7. That in all cases of subsidies it is desirable as far as possible to observe the following principles:

That every endeavor should be made to maintain the pre-eminence of British lines, and that it is desirable to secure unification of control by placing the final negotiations in the hands of a small permanent committee.

That a condition of adequate speed should form part of every subsidy, to insure rapid communication within the empire, or to secure fast carriers of food supplies in time of war, or to meet Admiralty requirements.

That no British subsidy should be granted except on condition that the whole or partial sale or hire of any ship in receipt of the subsidy cannot take place without permission of the Government.

It is desirable that the majority of the boards of directors of subsidized companies should be British subjects.

That on subsidized vessels the captain, officers and a proportion of the crew ought to be British subjects.

8. That with a view to the fair competition of British ship owners with their foreign rivals:

Board of Trade regulations should be enforced against foreign ships equally with British ships.

Light dues should be abolished.

Means should be taken to obtain the removal of foreign laws and regulations which exclude the British ship owners from the trades appropriated by various foreign powers to their own shipping as "coasting trade," and that if need be regulations for the admission of foreign vessels to the British and colonial trade of this empire should be used with the object of securing reciprocal advantages for British ship owners abroad.

I venture the opinion that this report is well worth careful perusal by every reader of *The Iron Age* who is concerned with shipping, either as a shipbuilder, ship owner, exporter or manufacturer of shipping accessories. There is general concern in this country as to the advantages possessed by our foreign competitors in the various directions indicated in this report. It is not in the least likely that Parliament will give effect to all these conclusions and recommendations; it is, however, quite probable that the line of policy suggested by the committee may be gradually assimilated by the British Government. S. G. H.

Pneumatic Tools Abroad.

J. W. Duntley, president of the Chicago Pneumatic Tool Company, arrived in Chicago on December 15 after a remarkably successful European trip. Mr. Duntley's principal object in making this trip was to establish a new plant for the manufacture of pneumatic machinery, and he accomplished his purpose, making arrangements for the erection of a plant at Fraserburg, in Aberdeenshire, Scotland, which will cost approximately $175,000. The necessary machinery will be purchased in this country. The business of the company has reached such proportions as to make their present facilities totally inadequate and necessitated the building of an additional factory abroad, despite the fact that the company have at present two large factories in Europe. Mr. Duntley also made an arrangement with a large German factory to manufacture his company's tools on a contract.

Mr. Duntley states that foreign trade conditions are excellent and expresses himself as somewhat astonished at the remarkable success of the London office of his company relative to the extension of their business abroad. As an indication of the flourishing trade conditions abroad it might be stated that Mr. Duntley brought back with him nearly 2500 orders for pneumatic appliances.

In regard to the work accomplished by the detail of skilled mechanics which his company sent abroad a few months ago to introduce pneumatic tools in Europe Mr. Duntley speaks very encouragingly, stating that they are meeting with very gratifying results everywhere, but especially in the foreign shipyards. While he was in Europe the men were devoting their attention to the shipyards of Germany and had visited seven of them, succeeding in having the Chicago Pneumatic Tool Company's tools adopted as the standard in each yard. He has also received requests to send these men to France, Spain and Italy, and intends doing so in the near future. The German Emperor has evinced considerable interest in the exhibitions made in the German Imperial Shipyards, having personally inspected the work on several occasions.

A test of the experimental steel road recently laid in Murray street, between Church street and Broadway, New York, by the Automobile Club of America was made last week under the direction of Gen. Roy Stone, the originator of the movement in favor of these highways, and the results were a remarkable demonstration of the value of the system. It was found by actual experiment that a tractive force 60 per cent. greater was required to draw a load upon the rough stone pavement than upon the track, or that, taking the power necessary to draw the load upon the pavement as the standard, exactly 37½ per cent. of it was saved by using the rails. In starting the load the advantage in favor of the rails was even greater, as but one-half or one-third of the usual force was required. The rails are about 1 foot wide, slightly flanged at the edges, and are laid in beds of concrete, flush with the street pavement, and the usual distance apart. There is a double line the entire length of the block.

Frank Hedley, who has been connected with the Chicago Elevated Railroads, has been appointed general superintendent of the underground system of the Interborough Rapid Transit Company of New York.

The Iron Age

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Through Ocean and Rail Rates.

Some interesting evidence was brought out at a hearing before the Interstate Commerce Commission in New York on the 19th inst. The special purpose of the hearing was to investigate the railroad rates on import traffic, pursuant to a resolution of the United States Senate passed June 24. The freight traffic manager of the Baltimore & Ohio Railroad Company testified that the rate charged by his road on crockery from New York to Chicago was only 18 cents per 100 pounds on imports, whereas like goods shipped from New York pay 65 cents per 100 pounds. Another witness testified that the freight rate on cement from a point in New Jersey to East St. Louis is 66 1-5 cents per barrel, while from Antwerp or Hamburg the through rate by sea and rail to the same point is only 65 cents per barrel. The same discrimination as to cement is said to be made to other places in the West, the domestic product invariably paying a higher rate from points near New York than the through rate from a foreign port. The representatives of the railroads who were examined regarding this discrimination attributed the low through rate for imported goods to the competition of the ports for shipping. The steamship lines make a rate to secure the business and the railroad companies co-operate with them even though the proportion received for the rail haul is less than the regular rail tariff.

The attitude of the railroad officials who were examined regarding this discrimination against domestic products does not promise an immediate change in their policy. The freight traffic manager of the New York Central Railroad is reported as testifying that in his opinion the difference in rate between imported and domestic goods is more apparent than real, which is simply evasive. The vice-president of the Delaware, Lackawanna & Western Railroad is also reported as saying that he believed these conditions have no adverse bearing on commerce, most of the articles and commodities affected not being port products. This is decidedly refreshing to manufacturers whose establishments, though not actually located at the port of New York, may be not far from it on the Lackawanna system in New Jersey. Their apparent advantage of nearness to their customers in the West, as compared with competing manufacturers over the sea, is more than nullified by the particular railroad company securing the greater part of their freight business.

Inasmuch as these conditions are sufficiently serious in respect of some commodities to overcome the tariff protection designed by our laws, it would seem that they should easily be remedied if the Interstate Commerce Commission, a branch of the National Government, possesses any power whatever over railroad rates. It is not reasonable to suppose that such discrimination in favor of foreign manufacturers should be permitted to continue if it can be corrected. The point must not be overlooked, however, that this is a practice which cuts both ways. It happens that just now this country is enjoying not only unprecedented prosperity but is thus exceptionally prosperous while European countries are suffering from depression. Consequently the pressure to dispose of surplus products of European factories in this country is very great, and the steamship lines are pleased to get the westward freight, as they usually carry a much larger cargo eastward than westward. But time evens all things, and the day will come as surely as the sun shines when American manufacturers will be more eagerly seeking foreign trade to relieve the home market. They will then expect from the railroad and steamship lines equally favorable treatment in reaching foreign ports to that now accorded foreign manufacturers in reaching American markets.

Salary Earners and Wage Earners.

That so much nonsense is talked and written about "the relations between capital and labor" is doubtless due to several causes, chief among which may be counted the common use of terms without accurate definition, and, consequently, without clear idea of their meaning. Out of this has grown the notion that there exists a state of war between capital and labor. Undoubtedly there is something like war going on all the time in the industrial world, but it is not, never was and never can be a war of labor against capital or of capital against labor. Why it is not and cannot be will be understood if we will stop to consider what capital is and what labor is. If both terms are correctly defined it will appear at a glance that what they respectively represent cannot be in conflict.

Capital is a passive instrument. It may be anything from a shovel or a hammer to a complete plant valued at millions of dollars. In the case of a railroad it comprises right of way, roadbed, rails, bridges, stations, engines, cars, and the countless items of equipment. In the case of a manufactory it is represented by buildings, machinery, materials, unsold products and the like, with enough money or credit to permit business to be carried on by anticipating collections in the settlement of matured bills payable and the regular payment of wages for work performed. As the rule this part of capital is borrowed money, usually obtained from banks and constituting an indebtedness which has to be shifted every 60 or 90 days to keep it afloat. The capital which is permanently invested is represented by stock or bonds, which are usually held by people who have little or nothing to do with the business, beyond standing to it in the position of creditors for what was expended in providing its productive facilities. If the capital is increased by accumulations of undivided profits, these undivided profits belong to the stockholders, save in so far as the bondholders have some equable claim upon them, "as their interest may appear." The bondholder is usually a conservative investor, who has no connection with the business whatever. The stockholder is connected with it only to the extent of annually assisting in the choice of directors, who in turn choose the officers. Obviously, the wage earner, whatever his grievances, has no quarrel with the stockholder nor with the bondholder. He can have no quarrel with capital, which is incapable of exciting or reciprocating resentment, as much so as his hammer or his spade.

It is also important to an understanding of the industrial situation that a distinction be made between capital and capital stock—or, to use the familiar term, capitalization. The amount of a corporation's capital stock is no measure of its capital. Under the present system of corporate finance, capital stock seldom repre-

sents anything tangible. It may be millions of dollars and be unrepresented by any assets whatever. The real assets, which constitute capital, are represented by bonds and preferred stock, or by bonds alone. Instead of being an element of strength to a corporation, a large capitalization is often—and, indeed, usually—an element of weakness, diluting the value of its real capital and impairing the borrowing power of the company assuming this responsibility. It may make no great difference whether stock which represents nothing is called a thousand dollars or a million. It is not capital, but a liability, which, under reorganization, may be wiped out if necessary, leaving the real capital neither more nor less in consequence of this somewhat drastic measure of financial reform.

The owners of the capital of a manufacturing concern rarely have anything to do with the management. They are in evidence only when there are not profits to divide or interest to pay, or when it is necessary to take steps to protect their investment. They are immediately represented by the trustees, or directors, whom they do not choose, but who are supposed to be in some sense their agents, and less directly by the officers, upon whom devolve the responsibilities of the executive management of the business in which the capital is employed. So far as any relations with labor, friendly or otherwise, are concerned, the investor may be left out of consideration. He and the workingman never come together in the relation of employer and employee, and would not recognize one another in such relation. All of this may seem like the broadest of generalities, popularly designated as platitudes, and so it would be if it did not lead to the conclusion, which has been escaped in most discussions of the so-called labor question, that since capital is only a passive instrument in production it has not, never did have and never can have any interests antagonistic to those who use it in production any more than a machine or a tool can be at odds with the mechanic who uses it in his work.

What, then, is the conflict which undoubtedly exists and has been assumed to be between capital and labor?

Capital is invested in productive industries on the reasonable assurance of safety and the reasonable prospect of being able to earn at least as much as it would in other employments. Obviously, those who make such investments cannot watch or manage them when made, but must intrust these duties to salaried men, who are called officers, and are hired from year to year and paid salaries more or less liberal, according to the measure of confidence felt in them. They work for the company exactly as the bench mechanics or the yard laborers do, and, generally speaking, their work is as much harder as their pay is better. They employ and discharge, increase or lower wages, grant or refuse the demands of the labor unions, and in all relations with the wage earners appear as the tangible incarnation of the somewhat intangible corporation for which they speak and act. When any differences arise it is not between labor and capital at all, but between the higher and lower grades of labor—the one feeling the obligation to defend the conditions deemed essential to the safety and profit of the investments for which they have assumed responsibility, and the other seeking its own advantage with little concern for, and less knowledge of, what the consequences to investors may be. It would seem as if a recognition of this elementary fact in industrial organization might pave the way to a somewhat better understanding between the two classes of labor than has hitherto existed. That labor does not understand it may be inferred from the tone in which the alleged "selfishness of capital" is discussed in the councils of the unions. Capital is incapable of selfishness or of any other attribute of intelligence. As well in a game of football accuse the ball of partiality for one or the other of the contending sides.

So far as capital is concerned, each of the classes of labor it sets in motion is inspired by the same purpose —a desire to get all it can for itself. The difference is that the salary earning class understands better than the wage earning class how much it can squeeze the goose which lays the golden eggs for it without impairing its egg-laying powers; and, in the case of the salary earning class, how much it can permit the wage earning class to do this. The salary earning class understands that if investments are lost production is as impossible as if machinery were crippled and unrepairable, or tools destroyed and unreplaceable. Hence, it seeks at all times to avert conditions which threaten such a calamity. It also knows that if capital does not earn interest at a satisfactory rate, those who have furnished it will as far as possible withdraw it, and at all events no additional capital will be obtainable for the extension of the industry. This will diminish the opportunities for salary employment as well as for wage employment. But there is this difference again: Wage labor suffers no other disadvantage from the failure of an industry than the necessity for seeking other employment, whereas salaried labor, with the adverse prestige of managerial unsuccess, is not likely to find employment at all. Consequently, in the never ending struggle the wage earner is contending for an advantage which he wants, and if in his effort to get it he is unsuccessful he suffers no greater disadvantage than a change of employments, while the salary earner, whose reputation for managerial capacity is at stake, is fighting for his business life, his career and his future.

It is doubtless owing in great degree to the lack of a clear understanding on the part of the wage earners of the difficulties and anxieties of the salary earners that so many discussions as to wages and conditions of work end in strikes. The constant struggle to maintain equilibrium between bills payable and bills receivable; the anxious hours which often precede provision for the weekly pay roll when the bottom of the till has been scraped, every available scrap of negotiable paper has been discounted or declined by the banks and every account drawn upon to the limit of toleration; the disappointments resulting from the delay or default of expected payments; the uncertainty as to the course of markets, in which any adverse change may mean ruin, these and a hundred other executive problems are the portion of the salary earners, and if the wage earners could in any way be made participants therein the whole atmosphere of distrust and suspicion would be cleared. This, however, nothing in the present system of industrial organization provides for. Perhaps it will always to be—a probability which emphasizes the practical wisdom of better co-operation than has been reached in most trades among their salary earning representatives.

Elbert H. Gary, chairman of the Executive Committee of the United States Steel Corporation, and E. J. Buffington, president of the Illinois Steel Company, accompanied by their families, will spend the Christmas holidays in California.

The director of the syndicate of pig iron manufacturers of the Rhenish provinces and Westphalia, Karl Burghardt of Düsseldorf, returns home in a few days, after about two weeks' stay in this country.

Worcester Manufacturing News.

The Absorption of the Union Steel Company.

WORCESTER, MASS., December 22, 1902.—The independent wire manufacturers of Worcester and vicinity are not rejoicing at the absorption by the United States Steel Corporation of the Union Steel Company. The talk which has followed has brought out the fact that the independent wire companies have their eyes on the tariff schedule, and when the tariff comes up for revision in Congress they will use all the influence they can summon to have the tariff taken off wire rods, or at any rate reduced a good deal from the present figure, which they deem a high one. A representative of *The Iron Age* has interviewed several of the local wire manufacturers on the subject and has found that this matter of tariff revision is one very near to them, and has become more so since they heard of the sale of the Union Steel Company. They have been customers of the Union Steel Company, and until recently of the Sharon Steel Company, recently merged into the Union Steel Company, and at times were able to make better terms with the American Steel & Wire Company for their rods because of the presence in the field as competitors of the two large independent manufacturers of billets and rods. Several times, one of the manufacturers said, he was able to get the American Steel & Wire Company and either the Sharon or Union Company bidding against one another, and the result was lower prices for rods than the former had quoted to him. Recently, however, the American Steel & Wire Company had been underbidding all smaller competitors, and a contract for nearly $100,000 worth of rods was placed with the big company by a Worcester wire works in a competition in which every rod maker in the country had been asked to participate. But the independent manufacturers see in the acquisition of the Union Steel Company by the United States Steel Corporation the nearing of the end of competition in the American rod market. They still have foreign rods to turn to, they point out, and that fact will keep the American price of rods down to a certain figure, even if the big company should show a desire to send their prices kiting.

The machine tool manufacturers are still very busy. The large concerns state that orders are keeping up to the full limit of the capacity of their shops, but several of the smaller manufacturers say that business has fallen off a little, though hardly enough to worry them.

The Worcester plant of the Ames Plow Company is unusually busy. It is understood that this shop is turning out a part of a large order for the South African market.

The Rice, Barton & Fales Machine & Iron Company, manufacturers of paper making machinery, have got rid of their infinitesimal strike, where three coremakers went out and then picketed the place, where one man was left at work. The trouble has been settled agreeably to all concerned, but what terms were made is not given out.

The National Emery Wheel Company of Waltham, Mass., have decided to locate in Worcester, and have bought 35,000 square feet of land at Jamesville, on the main line of the Boston & Albany road. In addition the company have an option on 40,000 additional feet. A new shop will be built, 60 x 250 feet, and one story high, and in it will be placed 8 kilns and 11 ovens. Work will begin on the shop as soon as the weather will permit. George F. Reiff, the treasurer and manager of the company, and H. F. Sanderson, the shop superintendent, have been on the ground for a number of weeks, and have interested considerable Worcester capital in the enterprise. It is a New Hampshire corporation, with an authorized capital stock of $75,000. The company have the contract, it is given out, for all the emery wheels used by the United States Shoe Machinery Company.

The newly organized Standard Plunger Elevator Company are already manufacturing, although it will be March before the new shops at Jamesville are ready for occupancy. Contracts already received are being filled at a machine shop in Boston, and business is being solicited under this arrangement. A recent order is for the elevators for the new plant of the American Optical Company, at Southbridge, Mass.

There is grief and some anxiety at the works of the Washburn & Moen Department of the American Steel & Wire Company over the resignation of Philip W. Moen, second vice-president and Eastern manager. Mr. Moen had under his charge the Washburn & Moen Department, the New York office and the San Francisco wire rope and cable plant, which was built by the Washburn & Moen Mfg. Company before the business was sold out to the American Steel & Wire Company, and which has since been enlarged. Because of Mr. Moen's intimate knowledge of the cable and rope business the extreme Western plant of the American Steel & Wire Company was made a part of the Eastern division. Mr. Moen will sever his connection with the business about January 1.

The Washburn & Moen Works are exceedingly busy in every department, and night gangs are practically everywhere through the works. The officers of the American Steel & Wire Company, with representatives of the United States Steel Corporation, have just made their semiannual tour of inspection, which was a thorough one, occupying all of two days. A good many changes of more or less importance have been made at the works in the past six months and the visiting officials expressed themselves pleased with what they saw. The insulating department is very busy at present filling the order for the electrical wire and cables for the St. Louis Exposition.

Consolidation of Wood Screw Interests.

The Wright & Colton Wire Cloth Company have sold their wood screw business, machinery and stock to the American Screw Company of Providence, R. I. The department employed about 50 hands and has been running day and night for four years. Its annual product was 800,000 gross of round, flat and oval head iron wood screws and a few rivets. The department was established seven years ago. The room occupied by the screw department will soon be given over to a new department and to extension of present departments. The company are at present making a specialty of the manufacture and sale of wire machinery, and that department will have to be enlarged in the near future.

The Boston Screw Company of Fitchburg, Mass., have also sold out to the American Screw Company, and so have one or two others of the smaller wood screw concerns of New England.

The Reed & Prince Mfg. Company of Worcester have not been taken into the combination, and their officers state that they will not be. That company are rushing work on their new and big plant at New Worcester.

Worcester County will soon be in the market for the equipment of a cable road up Mt. Wachusett, which is the highest point in the State of Massachusetts, between the Berkshires and the ocean, and is now the property of the State, which acquired it several years ago for a public reservation. Two companies have been organized to build a cable road up the mountain, to be a part of an electric street railway system. The mountain is about 2200 feet above sea level, and the actual rise by cable will be between 800 and 1000 feet. It will be double track and will closely resemble the cable road up Mt. Tom, near the Connecticut River. The commissioners of the Wachusett reservation are considering two petitions, both of which are backed by means ample for the project, and one or the other of the two companies will get the location this winter and will build in the spring. The system will include an electric power station.

Barker & Nourse, architects, of Worcester are making plans for a large furniture manufacturing plant, to be built by B. Souto & Co. of New York, at Brattleboro, Vt. There will be five buildings: A factory 50 x 152 feet; storehouse, 65 x 104 feet; building for finishing, 50 x 96 feet, and a drying kiln and power station. Holden & Martin of Brattleboro have the contract for the buildings.

Scoville & Wheeler of Worcester have the contract for a $50,000 building for the new Massachusetts insane colony, at Gardner, Mass.

The Fuel Outlook.

The smaller manufacturers have not a pleasant outlook as to their coal supply. The price of bituminous coal is very high, the local dealers charging $10 a long ton, and most of the smaller concerns are dependent upon the Worcester dealers. Of course the large concerns are getting their coal cheaper than this and they have an abundant supply, but the item of coal is entering into the calculations of cost departments as it never has before. It is not so much the price of coal that bothers manufacturers, however, but the amount in sight. As yet the harbors at which are the great coal pockets, such as Norwich, Conn., and Providence, R. I., and Boston, are open to shipping, though during the recent period of extreme cold all froze up temporarily, making it impossible for the barges to get to the docks. A continued cold spell would cut off the supply of coal by water and would throw consumers upon the resources of the railroads, which are already taxed to their utmost to keep anthracite coal moving into New England. In fact, although anthracite is selling at from $10 to $12 a ton, and within a week has been as high as $15 a ton in Worcester, it is more plentiful than bituminous. Welsh coal has proved an utter failure for steam purposes in the power plants hereabouts. The best test has been at the big power station of the Worcester Consolidated Street Railway Company, where they are trying to burn up 5000 tons of this semibituminous fuel. The new 3000 horse-power Allis-Chalmers engine is working beautifully, when it gets the steam, but it has been found at times when the demands of the street system are pulling hard upon the power station that it is absolutely impossible to maintain steam pressure. A fireman is maintained at every boiler, where ordinarily one fireman to two or three boilers is ample. But time and time again it has been necessary to shut down power temporarily until steam was raised to the normal pressure. The trouble is that the coal clinkers in great masses which are almost impossible to break up. Nearly every manufacturer in this part of New England has plans on foot to increase coal storage capacity, so that he may always be able to take better advantage of low coal prices and to meet such an emergency as now confronts him.

The William Allen & Sons Company, manufacturers of boilers, are rushed with business. The company have been making a specialty of kerrs for bleacheries and steam boxes for use in the manufacture of plushes, velvets and velveteens, and orders for them have been as numerous as those for boilers for steam and heating purposes. Among the recent orders are these: One hundred horse-power boiler for the Warren Steam Pump Company of Warren, Mass.; 150 horse-power boiler, with a 54-inch bell bottom self sustaining stack, 80 feet high, for the Howe Shoe Company of Marlborough, Mass.; two 250 horse-power boilers, with 54-inch self sustaining stack, 80 feet high, for James Orr of Pawtucket, R. I.; 100 horse-power boiler and stack for the Mills River Electric Light Company, at Williamsburg, Mass.; two 100 horse-power boilers for the Textile Novelty Company of Jewett City, Conn., and also for the same concern a steam box 9 feet in diameter and 30 feet long; two 150 horse-power boilers for the new Standard Plunger Elevator Company, with 54-inch stack, 90 feet high, for the new plant of the company at Jamesville, Worcester; steam box 8 feet in diameter and 20 feet long for the Centrexville Mfg. Company of Mannville, R. I.; three kerrs for the Stevens Mfg. Company of Providence, R. I.; kerr for the Interlaken Mills of Providence, R. I.; kerr for the Newburgh, N. Y., bleachery; kerr for the Schuylkill Haven Bleach & Dye Works of Schuylkill Haven, Pa.; two kerrs for I. Brill & Co., lace manufacturers, New York; kerr for the Meriden Curtain Fixture Company of Meriden, Conn.; two kerrs for the American Thread Company, at Holyoke, Mass., and one especially large kerr, 10 feet in diameter and 14 feet long, for the Richmond Bleach & Dye Company of Philadelphia.

Interesting Electrical Experiments.

Prof. Harold B. Smith, head of the department of electrical engineering of the Worcester Polytechnic Institute, has concluded a long series of experiments with low frequency electric currents of very high potentials. New principles have been evolved, which will be of great importance in the transmission of power over great distances, it is claimed. Professor Smith has made these experiments with a transformer which has developed 500,000 volts, which is the highest voltage ever obtained by a low frequency current in a single transformer. The principles involved, which will be given in detail to the scientific world next spring, are these:

Potential, or electrical pressure, and distance of transmission of power are not alone the causes of loss of power in transmission. The size of the conductor, or wire, has a great deal to do with loss of power, due to leakage between the conductors; the larger the conductor the less the loss. Iron wire is a good and practical conductor, to replace copper, for high potential currents over long distances under certain conditions.

Professor Smith asserts that the generally accepted theory of electrical engineers, that in power transmission over a distance the loss of power due to leakage between conductors increases as the voltage is increased, is not sound. The experiments have shown that the commonly accepted statement of a great electrical engineer, that in his opinion from 50,000 to 70,000 volts is the limit for power transmission, is incorrect. Experiments with insulators, which accompanied the study of high potential currents, gave results which were of advantage to the Standard Electric Company of California, who are conveying power a distance of 200 miles from water power to Oakland and San Francisco. Insulators were made which withstood a pressure of 235,000 volts.

CORRESPONDENCE.

Successful Starting of Rod Mills.

To the Editor: That "practice makes perfect" is not only an old but a true adage, and as a remarkable proof of the truth of that old saying, from a rolling mill engineering standpoint, I will refer to two wire rod mills called by the "unscientific" engineers rod mills of the "Garrett" type, but referred to by "scientific" engineers as rod mills of the "Belgian" type. One of these mills, owned and operated by the Kokomo Steel & Wire Company, a mill of limited capacity, as it were, guaranteed to produce 200 tons in 24 hours, was not in operation over two weeks before there had been rolled over 100 gross tons in a single turn, and this is now being done on an average. The other rod mill, built and operated by the Pittsburgh Steel Company, at Monessen, Pa., and guaranteed to produce 400 tons of wire rods per 24 hours, had only been in operation two weeks when there were produced over 407,000 pounds of No. 5 rods in a single turn. While the rolling mill engineers (the Garrett-Cromwell Engineering Company) who designed this mill have great reason to feel very proud of such results, still, as a matter of fact, if the management in both mills were not of such high order and the roller in charge of this latter mill, who put the many parts together, were not a first-class workman, such results could not be obtained. The writer, who has most likely had more experience than any other living man in the erection of rod mills, cannot help paying a passing tribute to Geo. Nash, superintendent, and W. H. Wagner, roller, of the Pittsburgh Steel Company, and John Mitchell, engineer, and Thos. Harris, superintendent, of the Kokomo Steel & Wire Company's rod mill. The successful start of the two mills mentioned above beats the record, and when it is considered that in both of the mills referred to about 9000 horse-power in boilers and engines have been used, and when thought is given to the vast amount of steam pipe, water pipe, sewers, &c., which is embodied in such plants, the two achievements should be noted as remarkable results. WM. GARRETT.

CLEVELAND, OHIO, December 22, 1902.

The committee of the employees of the Hendey Machine Company, Torrington, Conn., have sent out invita-

tions to a complimentary concert and ball to be given in the company's new factory, on Friday evening, December 26.

PERSONAL.

Isaac Joseph, president of the Isaac Joseph Iron Company, Cincinnati, Ohio, has returned from a trip to Mexico.

Andrew Carnegie entertained 24 of his old associates in the Carnegie Steel Company at a house warming dinner in his new house, at Fifth avenue and Ninety-first street, New York, on December 18.

F. E. Drake, formerly Director of Machinery and Electricity for the United States at the Paris Exposition, returned last week from Berlin, where he has spent two years with the Union Electric Company reorganizing their plant.

David Hunt, Jr., has resigned as the Cleveland, Ohio, representative of Manning, Maxwell & Moore of New York, to become general manager of the Baush Machine Tool Company of Springfield, Mass.

A. S. Matheson, third vice-president of the National Tube Company, with headquarters in New York, has tendered his resignation, to take effect January 1. No successor will be elected, as the office of third vice-president will be abolished.

J. F. Deems, superintendent of the American Locomotive Works, has resigned to accept the appointment of superintendent of motive power of all the Vanderbilt lines east of the Mississippi.

Charles Crowther, formerly manager of Niles Furnace of the National Steel Company, at Niles, Ohio, has resigned and has been succeeded by J. C. Barrett.

Elbert H. Gary, chairman of the Executive Committee; James Gayley, first vice-president, and Geo. W. Perkins, chairman of the Finance Committee of the United States Steel Corporation, were in Chicago during the past week.

L. T. Canfield, master car builder for the Delaware, Lackawanna & Western Railroad, and well known in iron and steel circles as the inventor of an improved car truck, has tendered his resignation to become vice-president of a railway supply company, with headquarters in New York City. He was formerly connected with the Standard Railway Equipment Company.

Frank M. Eaton, general sales agent of the Virginia Iron, Coal & Coke Company, will sever his connection with that company to become a member of the firm of Hickman, Williams & Co., pig iron merchants of Louisville, Ky., and Chicago. Mr. Eaton will establish himself at Cincinnati, Ohio, so that the new firm, Hickman, Williams & Eaton will be also represented in that market.

C. Banning of Banning & Cooper, steel merchants of Pittsburgh, has just returned from a stay in Germany.

Edward A. Uehling has established himself as consulting engineer, with headquarters at 135 Broadway, N. Y. Mr. Uehling has had many years' experience as a blast furnace manager at Bethlehem, Birmingham and other producing centers, and devoted the last seven years to the development of the well-known Uehling pig casting machine and the pyrometers which bear his name. He has in recent years studied closely abroad the problems incidental to the recovery of waste products in coke manufacture and pig iron smelting.

At the recent election of the directors and officers of the Manufacturers' Club of Buffalo the iron and steel interests were given prominent recognition by the selection as third vice-president of John G. H. Marvin, president of the L. & I. J. White Company of that city, manufacturers of machine knives and edge tools, and the choosing as one of the directors of Harry Yates, general agent of the Rochester & Pittsburgh Coal & Iron Company. Both of these gentlemen have long been factors in the business community of Buffalo and leaders in the movement for the industrial progress of the city, which the club was organized to foster and carry forward.

MANUFACTURING.

Iron and Steel.

Contracts for the construction of the first building of the Pacific Steel & Wire Company, which will be erected at Oakland, Cal., have been filed by the architects. The building will be one story, brick, 132 x 418 feet. The estimated cost will be about $32,000.

The Shenango works of the American Tin Plate Company, at New Castle, Pa., which contain 30 hot mills and which have been idle for a long time, will be started on Monday, December 29.

The rumor that the Elwood, Ind., tin plate mills will be removed has been pronounced entirely unfounded by the district manager of the American Tin Plate Company.

Spring Valley Furnace, Spring Valley, Wis., blew out on November 1 for relining and blew in again December 11. The product is malleable Bessemer made from coke, but some charcoal iron will be made from now until about July 1.

The Navy Department, Washington, D. C., will receive bids until February 12, 1903, for furnishing armor for naval vessels. All information may be obtained from Chief of the Bureau of Ordnance.

The Sanderson Bros. works of the Crucible Steel Company of America, at Syracuse, N. Y., are being greatly improved. A new power house, 28 x 40 feet, is being erected, in which will be installed two 100 horse-power boilers, and the capacity of the other departments is being greatly increased by additional machinery, all of which has been secured. The boilers were supplied by the Ames Iron Works, Oswego, N. Y.; the blowing engines by the Buffalo Forge Company, Buffalo, N. Y.; a 200 horse-power engine by the Erie City Iron Works, Erie, Pa.; a smaller engine by the Straight Line Engine Company, Syracuse, N. Y.; the pumps by the Snow works of the International Steam Pump Company at Buffalo, N. Y., and the heaters for boilers by the Stilwell-Bierce & Smith-Valle Company, Dayton, Ohio. The company erected their own buildings, which with new equipment will represent an outlay of $20,000.

The Lackawanna Steel Company, Buffalo, N. Y., received their first consignment of 6200 tons of ore from upper lake points December 23. This practically marks the opening of their new plant.

General Machinery.

The Baltimore Rolling Mill Company, 604 Continental Trust Building, Baltimore, Md., are in the market for 18 and 10 inch mills, an engine about 30 x 36 inches to drive the 10-inch train, and a full line of shears for scrap and to shear finished bar. A description of their plant is printed in another column.

The Larzelere Machine Company, Williamsport, Pa., have recently made additions to their machine shop and foundry, and have also erected a new engine and boiler room, installing a larger engine and boiler. They have been doing an unusual amount of work in castings, more particularly large columns for buildings, and have now a contract on hand which will take four months to complete. Their outlook for business during the coming year is very encouraging.

The Leavitt Machine Company, Orange, Mass., contemplate enlarging their plant.

H. B. Underwood & Co., Philadelphia, Pa., general machinists, will build an addition to their machine shop 23 x 51 feet.

Regarding the fire which recently damaged their works at Nashua, N. H., the Eastern Forge Company, Boston, Mass., write us that no tools or machinery were damaged beyond repair and the operation of the works goes on without cessation, except that they lose the product of one hammer, out of a total of nine, for a week or ten days.

The Richart Mfg. Company, Scranton, Pa., were commenced on May 1 this year to manufacture Richart's roller belt dressing machine, a device for applying dressing to leather belts. The company will be incorporated the early part of next year.

The National Iron Company, West Duluth, Minn., have largely increased their working force because of heavy new contracts.

The Weimer Machine Works Company of Lebanon, Pa., have received an order from the Bon Air Coal & Iron Company of Nashville, Tenn., for one of their 42 x 84 x 60 inch blowing engines, to be placed at their furnace at Allen's Creek, Tenn. This engine is to be a duplicate of the one the Weimer Company installed for the Bon Air people some six months ago. The company are also building for the National Steel Company's works at Bingo Junction, Ohio, a number of hot metal cars, and for the Ohio works a number of scrap cars.

The Eaton, Cole & Burnham Company, Bridgeport, Conn., have decided not to build their proposed machine shop at the present time, plans for which are completed. They contemplate erecting a building 50 x 100 feet, of three stories.

The Albuquerque Gas, Electric Light & Power Company, Albuquerque, N. Mex., are figuring on installing additional machinery to take care of their increasing business. Maynard Gunsul is manager.

A second-hand 60-inch boring mill and machines to form and wire sheet iron bake pans are required by the E. M. Roberts Company, Ashland, Ky., recently incorporated to do general foundry and machine work and to manufacture gas engines of 20 horse-power and the Howard filter. The company are erecting a brick foundry and machine shop, 45 x 90 feet, which they hope to have in operation early in February. Most of the equipment has been secured and includes a gas engine from the Superior Gas Engine Company, Springfield, Ohio; lathes from Lodge & Shipley, Cincinnati, Ohio, and some other machinery from the C. C. Wormer Machinery Company, Detroit, Mich. E. M. Roberts is president.

The H. W. Dopp Company have incorporated with a capital of $40,000 to acquire the business of H. William Dopp & Sons, Buffalo, N. Y., and to manufacture soap-making machinery. The directors named are Charles Bosche, George R. Howard, S. E. Griffin, John Sedgwicke, R. L. Cox, F. K. Kernan, and J. A. Robinson.

The Frontier Iron Works, Buffalo, N. Y., capitalized at $10,000, have filed their certificate of incorporation in the Erie County Clerk's office. The company will start business with $7000. Directors for the first year are T. B. Cooley, Walter F. Simon and Joseph H. Morey.

The Mesta Machine Company of Pittsburgh have closed a contract with the Standard Tin Plate Company of Canonsburg, Pa., for the following equipment: Two trains of 26-inch hot mills, with five stands of rolls; two trains of 22-inch cold mills, with six stands of rolls; also engines for the hot and cold mills, doubling shears, squaring shears, roll lathes and tin house equipment.

The Redding Engineering Company of Pittsburgh have secured a contract for 350 cotton pickers, to be completed in three lots, the last in time for the cotton crop in the fall of 1903. The machines are to be made for the Todd Cotton Harvesting Company of Chicago.

The Coshocton Machine & Mfg. Company, the recently organized company who succeeded the firm known as the Coshocton Machine Works, Coshocton, Ohio, will secure a site and erect a new building, 40 x 80 feet, two stories. The present power plant of 25 horse-power will also be increased. The company manufacture novelty iron and wood working machines and special dies.

Boilers, Engines, &c.

An engine about 30 x 36 inches, to drive a 10-inch train of rolls, is required by the Baltimore Rolling Mill Company, 604 Continental Trust Company, Baltimore, Md. See *General Machinery*.

The Tacoma Steam Boiler Works, S. D. Brear & Son, proprietors, Tacoma, Wash., have lately added to their equipment a 13,000-pound combined power punch and shears, power heading rolls for boilers, and several other tools. The firm have several large contracts on hand and report the outlook for business for the coming year very bright.

The Stroudsburg Engine Works, Stroudsburg, Pa., incorporated under the State laws of Pennsylvania in June last with a capital stock of $30,000, manufacture machinery for coal wharves, railroad, sewer, dock and bridge construction, dredging and structural work and suspension cableways. A machine shop has been built recently 52 x 100 feet, and foundry 40 x 60 feet. There are also blacksmith's shop and other buildings. Machinery of the most modern construction has been installed, including planers, lathes, drill presses, milling machines, shapers, emery grinders, with special tools and all the usual necessary small tools of a machine shop. A start to manufacture will be made the first of 1903.

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., have received an order from the Pittsburgh Coal Company for six 150 horse-power tubular boilers, destined for their various mines, and one from the Penfield Coal Company, Penfield, Pa., for one 40 horse-power Chandler & Taylor engine and one 50 horse-power horizontal tubular boiler.

The Burns Boiler Works Company, which were incorporated under the laws of Wisconsin with a capital stock of $100,000, have organized by electing the following officers: President, Wm. Larsen of Green Bay, Wis.; vice-president, W. M. Workman of De Pere; secretary and general manager, A. B. Burns; treasurer and assistant secretary, W. Quade. The directors of the company are: R. J. McGeehan, W. M. Workman, Robert Crabb Wm. Larsen, A. B. Burns, W. Quade and D. M. Burns. The plant will be located at De Pere, Wis.

The Empire Electric Light Company have purchased the electric light plant at Franklinville, N. Y., in which they will install a 100 horse-power engine and a 1000-light dynamo.

Robert L. Johnson, superintendent of public works, Columbus, Ga., writes us that the city has voted $250,000 in bonds for municipal water works. The city will proceed at once with the plans and arrangements for their construction.

The Shawd Gas Engine Company, Springfield, Ohio, will be incorporated after January 1 under the laws of West Virginia, with a capital stock of $50,000. The company have a well equipped plant in operation. They advise us that early in the coming year they will require some new machinery. The product is gas and gasoline engines of 2, 4 and 6 horse-power.

The Lehigh Railroad Company have placed an order with the Baldwin Locomotive Works, Philadelphia, for 40 locomotives, to be delivered during next year. All are to be of Standard Lehigh Valley pattern and will be for both the passenger and freight service.

The Brown-Cochran Company, Lorain, Ohio, recently shipped engines and refrigerators to the value of $9000 in one week. This is stated to be the largest week's business in the history of the company. It included a 4-ton refrigerating compressor and condenser and 17 engines. The company have their new shop about completed and expect to have it in operation early in January.

The Recorder of Winona, Minn., will receive bids for an electric light plant, including internal fired boilers of 250 horse-power, 250 horse-power Corliss engine, high speed engine, 300 R.P.M.; condenser, 5000 pounds per hour; belting, generators, &c. Copies of specifications may be obtained from City Engineer G. P. Coleman. Paul Kemp is recorder.

Bids are asked until January 6 for constructing water works at Ardmore, Ind. Ter., including pumping machinery, valves, hydrants, &c. Plans and specifications are on file at the offices of Chester B. Davis, engineer, 10 Wall street, New York, and San Antonio, Texas, and at the office of the city clerk, Ardmore. R. W. Dick is mayor.

Bids are asked until January 7 by Centerville, Miss., for the construction of a system of water works. Address Ackland H. Jones. C. H. Jenks, Fayette, is engineer.

The city lighting department of Elgin, Ill., is to ask for $41,095 for expenses for the coming year. Of this sum $6000 is desired for a new 100 horse-power boiler and a new alternating generator.

Foundries.

Jarvis & Bro., founders, Huntington, W. Va., have incorporated as the Jarvis Brothers Company, with a capital stock of $10,000.

The new and modern plant of the West Allis Malleable Iron & Chain Belt Company, Milwaukee, Wis., is now completed and in active operation. The first cast was made on the 5th inst., being witnessed by the officers of the company and a number of visitors. The new concern start out with plenty of orders on their books and with good prospects of doing a successful business. The officers of the company are O. L. Hollister, president and general manager; C. S. Otjen, vice-president; C. F. P. Pullen, treasurer; W. H. Shenners, secretary, and F. G. von Spreckelsen, superintendent and mechanical engineer.

The Queen City Foundry Company, Denver, Col., have let contracts for a new foundry 125 x 200 feet, to be built in three bays of 40 feet each, the center bay to be served by a three-motor 20-ton Pawling & Harnischfeger crane, the side bays each by a 5-ton hand traveler, pendant gearing, furnished by the Whiting Foundry Equipment Company. The building is to be of steel frame construction, with a maximum amount of glass, and will contain three Millett core ovens and three large ovens, each 13 x 25 feet. Coke will be used as fuel in the furnaces, which are equipped with rocking grates of the Queen City Foundry Company's design. The charging platform is 40 x 50 feet, 18 feet high, and designed to carry a load of 125 tons. The elevator will be operated by compressed air. The ladle storage and blower room will be located under the charging platform. Employment will be given to two cupolas, each with a tapping platform and the usual complement of ladles, all by the Whiting Foundry Equipment Company and two No. 4 blowers. The shop will be lighted by incandescent and arc lights and piped throughout for compressed air. The equipment includes molding machines, ladles and pneumatic tools. The improvements will require an outlay of $50,000. The capacity of the plant will be increased from 16 tons to 30 or 40 tons per day.

The Sheffield Car Company, Three Rivers, Mich., manufacturers of light cars, have been compelled through pressure of business to increase their capacity by building a new foundry, which will be 90 x 250 feet. When the equipment is installed they will be able to turn out three times their present output. A traveling crane will run the entire length of the building and other labor saving appliances of modern type will be installed. They expect to use considerable machine molding.

The Hill & Griffith Company, Cincinnati, Ohio, manufacturers of foundry facings, supplies and equipments are entering upon their fifth year and report an unprecedented demand for their specialties. Possessing an intimate knowledge through experience of the foundrymen's wants and having a personal acquaintance with most of the foundrymen of the South and West, as well as other sections of the country, the demand for their high grade plumbago and foundry facings having reached that point where they could with difficulty keep up with the orders, they have recently acquired a modern six-story building, installing the latest appliances in the way of machinery, &c. When completed it will be the largest plant in the country devoted exclusively to the production of foundry facings. The company are distributing a handsome calendar and would be pleased to have the name of every foundryman for a copy of their new complete catalogue, now in course of preparation and which will be ready for distribution about March 1.

The advertisement of the city of Chicago, Ill., asking for

bids December 11 for such hydrants, valves, &c., as may be required during the year was withdrawn and new bids will be asked for about March 10. Frank Murphy is contract clerk.

The United States Foundry Company, Buffalo, N. Y., have been incorporated this week and will establish a foundry plant and conduct a general foundry business. Edward Farrell has been elected president, John F. Patterson secretary, and J. Fred. Morlock treasurer and general manager.

Bridges and Buildings.

The Penn Bridge Company of Beaver Falls, Pa., are the lowest bidders for the brick and steel structure to be built for the United States Government at Norfolk, W. Va. Their bid was $74,830.

Fires.

Ernest Gabler & Brother's piano factory, 214-224 East Twenty-second street, New York, was destroyed by fire December 22. The loss is placed at $350,000.

The plant of the Miller Iron Company, Providence, R. I., was damaged by fire last week. The loss is stated to be $10,000.

A recent fire in the pattern storage room of the architectural iron works of Holmes, Pyott & Co., Chicago, caused damage to the extent of $2000 on building, while the loss on patterns is estimated at $6000, both insured.

The new plant of the Enamel Brick & Tile Company, Bellaire, Ohio, was destroyed by fire December 23.

Hardware.

The Indiana Foundry Company, Indiana, Pa., have under construction and partially finished a new drilling room 40 x 80 feet in size, with three new drills which will enable them to produce tuyeres much more rapidly than heretofore.

The Kansas City Roofing & Corrugating Company, 218 and 220 West Third street, Kansas City, Mo., advise us that Kansas City is now one of the largest distributing points for roofing material in the country. The business in this line has grown from a very small beginning in the early eighties to large proportions, their company alone during the year having sold about 4,000,000 pounds of steel and iron roofing, equal to about 5,000,000 square feet, and nearly the same quantity of prepared felt roofing, including their Paroid, Alligator and Ark brands. The company also manufacture tarred roofing felt, sheathing and insulating papers. The company were recently awarded the contract for a large quantity of heavy galvanized corrugated iron for recovering the train sheds of the Union Station, Atlanta, Ga., and are preparing for a large increase in their business in 1903.

The Seneca Chain Company, Kent, Ohio, have increased their capital stock from $25,000 to $50,000. They are building an addition to their forge room 30 x 100 feet, doubling the capacity in this department. This step was made necessary by the constant expansion in their trade. They are also putting in several large power hammers, as well as a Riehle hydraulic testing machine.

Miscellaneous.

Taylor & Stokley, Chester, Pa., machinery pattern makers, are about to move into new shops near their present location. The firm have had a very prosperous year and when settled in their new quarters will have one of the largest and best equipped jobbing shops in the East, enabling them to give very prompt deliveries.

The United Metile Company, Waltham, Mass., are enlarging their plant and will have upward of 30,000 square feet of floor space when the improvements are completed.

The plant of the Youngstown Car Mfg. Company, at Youngstown, Ohio, recently acquired by George T. Oliver and other capitalists of Pittsburgh, is to be remodeled at once and in addition to the repair of wooden freight cars the new company propose to devote considerable attention to building new steel cars. The plant has been in existence for 20 years and has always been prominent in railroad car building.

The Standard Traction Brake Company of Pittsburgh after January 1 will become the Westinghouse Traction Brake Company, and the conduct of the business will pass over to the Westinghouse Air Brake Company. The brake will be made at the Wilmerding works, the removal of several departments of the Westinghouse Electric & Mfg. Company to Trafford City having made room for the new industry without the erection of additional buildings. The brake is an invention used on traction cars and is especially valuable on steep grades. It works on both rail and wheel.

The plant and holdings of the Colonial Coke Company, at Smock, Fayette County, Pa., have been sold to T. S. Lackey and others of Uniontown, Pa., at the reported price of $275,000. The property consists of 75 acres of coal, 230 acres of surface and a coking plant. The new owners take possession January 1 and will at once enlarge the capacity of the plant.

The Hopkins Brake Company, 1115 Chemical Building, St. Louis, Mo., have incorporated for the manufacture of a street and tramway car brake, the invention of W. W. Hopkins. The company will probably establish a plant later on, but at present they are giving all their attention to a contract they have just concluded with the St. Louis Transit Company for the equipment of several of their cars with the new brake.

The National Liquid Gas Company have been recently incorporated by Pittsburgh capitalists to make liquid carbonic acid gas from coke. The company have secured coal property on which they have planned to erect by-product coke ovens of a new design. The acid refining plant is to be located at Zelienople, Ohio, and will be a building 150 x 200 feet in area and two stories high. The output of the chemical plant will be between 2,000,000 and 3,000,000 pounds of acid yearly. The capital stock of the company is $15,000, and their officers are J. A. Frauenheim, president; Emil Swenson, the well-known civil engineer and inventor, vice-president; W. C. Lynne, secretary, and I. Burnser, general manager. The work on the construction of the new plant will be started soon.

Henry Westerbeck is about to erect an independent tin can factory, to cost over $50,000, on a tract on Madison street and First and Second streets, in North St. Louis, Mo. The new factory will be modern and complete in every respect.

Steel Corporation Rumors.

A good many rumors have been current lately as to further purchases of property on the part of the United States Steel Corporation. One of these referred to the Troy Steel Company. It is a fact that some important officials of the corporation have lately inspected the plant, and the fact that the Rockefeller party is largely interested in both companies has lent color to the reports. Another rumor which has been given currency is that the corporation were negotiating for the property of the St. Clair Furnace Company and the St. Clair Steel Company at Clairton, Pa. These are subsidiary interests of the Crucible Steel Company of America, which they are to supply with raw materials. The reports offer the explanation that the corporation would make long time contracts for steel to supply the Crucible Steel Company. We are assured by one of the highest officials of the United States Steel Corporation that there is no truth in these reports. He states, in fact, that the corporation do not now contemplate the acquisition of any other outside properties, which should put at rest, too, the rumors that the Cambria Steel Company and the Jones & Laughlin Steel Company are to be gathered into the fold. This information is supplementary to that contained in an item on page 23 of this issue.

We understand that the purchase of the Sharon and Donora plants will cause some modifications of the general plans of betterments and additions to plants which have been maturing for so long a time. It is stated that the presidents of the constituent companies will soon report and that a decision as to the details of new construction will then follow.

A Large Chain Order.—An order has just been secured by Eli Attwood, president and general manager of the Lebanon Chain Works, Lebanon, Pa., from the New York Ship Building Company, Camden, N. J., for 44 pieces of 15 fathoms each 3⅛-inch Stud link anchor chain for vessels Nos. 5 and 6, now under construction at this shipbuilding plant, which are to be used as fast mail and passenger steamers between New York and London, running in connection with the "City of New York," "City of Paris," the "St. Paul" and "St. Louis." This chain is the second largest to be manufactured in this country, the Lebanon Chain Works just now finishing the making of the largest chain ever manufactured on this side—namely, the 3 3-16-inch Stud link cables for the Eastern Ship Building Company of New London. The 3⅛-inch chain consists of 660 fathoms, weighing approximately 560 pounds to the fathom. It is only 1-16 inch less in diameter of iron than the larger chain for the Eastern Ship Building Company, while the length required is the same. The chain is subject to the inspection and test of Lloyd's Register of British and Foreign Shipping, and will have to be of sufficient strength to meet the required breaking test of 482,160 pounds.

Iron and Industrial Stocks.

The feature of the week has been the strength of the United States Steel stocks, which have recovered to some extent from their recent decline, the recovery being accelerated by the favorable view taken by the speculative public of the acquisition of the Union Steel Company. The advance from the low point has been about $6 per share on both the common and the preferred. Transactions in both stocks have been quite heavy. Can preferred has advanced sharply on reports of excellent earnings. Other industrials have shown advancing tendencies, due to the more favorable condition of the money market.

Tidewater Steel Company.—The following is a statement of the operations of the Tidewater Steel Company, December estimated:

Net earnings six months ending December 31, 1902	$95,813
From which deduct amount passed to credit of maintenance and reserve fund	45,282
Balance	$50,530
From which deduct six months' dividend on $600,000 preferred stock	18.000
Leaving to credit of profit and loss	$32,530

Of the $45,282.87 above mentioned, set aside for Maintenance and Reserve Fund, $22,245.97 has been expended. The management adds: "The company's business is at the rate of about $2,500,000 and have on their books at present orders for about $1,000,000, with as much more pressing. The completion of the new open hearth furnaces early next year will largely increase the plant's output of steel ingots, thereby increasing the mill's present production of plates about 50 per cent."

The International Trust Company of Baltimore, the largest single interest, have approved the proposed financial plan of the Alabama Consolidated Coal & Iron Company. It is now thought that the approval of the required 75 per cent. of the stockholders is assured. This plan calls for an issue of $3,500,000 of 5 per cent. bonds and an increase in the common stock of the company from $2,500,000 to $3,500,000. Of the bond issue $2,500,000 would be used in exchange for a like amount of 7 per cent. preferred stock. Holders of this stock are to be tendered a bonus of 25 per cent. in common stock to make this exchange. The holders of $500,000 of bonds now outstanding will have an opportunity to exchange for the new bonds.

The net earnings of the Dominion Iron & Steel Company for November, with three furnaces in operation, were $50,000. This includes the Government bounty. The October net earnings were $45,000. Earnings of $50,000 a month are sufficient to meet the fixed charges and dividends on preferred stock. The directors have voted not to erect a steel rail mill at present, as was contemplated, but to use the new mill for the manufacture of structural and other forms of steel in which there is more profit.

The stockholders of the International Acheson Graphite Company of Niagara Falls have voted to reduce the outstanding capital stock from $2,000,000 to $500,000, of which $177,000 is to remain in the treasury and $333,000 is to be given in exchange for old stock. It was also decided to issue $125,000 5 per cent. 20-year bonds to retire the outstanding $100,000 preferred stock, on which dividends at the rate of 7 per cent. were paid on August 1, 1901, February 1, 1902, and August 1, 1902.

American Bicycle Company.—The Reorganization Committee of the American Bicycle Company, composed of William A. Read, chairman, Frederick P. Olcott, George F. Crane, Colgate Hoyt and F. S. Smithers, has adopted a reorganization plan filed with the Central Trust Company of New York, which provides for the organization of a new company to acquire the properties of the old by purchase. The new company will issue $2,500,000 6 per cent. cumulative first preferred stock, to be issued only for cash, to be preferential both as to dividends and assets, but to be redeemable, all or any part, at 110; $10,000,000 non-cumulative 6 per cent. preferred stock, preferential as to both dividends and assets, and $10,000,000 common stock. Holders of the present 5 per cent. debentures will be entitled to par in second preferred stock. Preferred stock is entitled to $50 in new common stock for each share and to $9 first preferred stock in return for a required assessment of $9 a share. The common stock is also assessed $9 a share and may receive $9 in a new first preferred stock and $25 in new common stock. Due notice will be given of the time when assessments are to be paid. The stock of the new company will be held under a voting trust for five years. A syndicate has underwritten all the cash payment required. Holders of the bonds, preferred and common stock of the American Bicycle Company are to deposit them with the Central Trust Company of New York not later than January 7, receiving thereof negotiable receipts. When in the judgment of the committee a sufficient amount shall have been deposited the plan will be declared operative. R. Lindsay Coleman, one of the receivers of the company, is reported to be opposed to the reorganization plan outlined, while A. A. Pope is in favor of it.

Dividends.—The Tidewater Steel Company have declared a semiannual dividend of 3 per cent. on the preferred stock.

The American Locomotive Company have declared a regular quarterly dividend of 1¾ per cent. on the preferred stock.

The American Shipbuilding Company have declared a quarterly dividend of 1¾ per cent. on their preferred stock.

The E. W. Bliss Company have declared the regular quarterly dividends of 2½ per cent. on their common stock and of 2 per cent. on their preferred stock, payable January 2. Books close December 27 and reopen January 2.

The Standard Coupler Company of Pittsburgh have declared dividends of 4 per cent. on the preferred and 1 per cent. on the common stocks, payable December 31.

The New York Air Brake Company have declared the regular quarterly dividend of 2 per cent.

The Empire Steel & Iron Company have declared the regular semiannual dividend of 1½ per cent. on the preferred stock.

The Hall Signal Company have declared the regular semiannual dividend of 1½ per cent. on the preferred stock.

The directors of the Standard Copper Company have declared a semiannual dividend of 4 per cent. on the preferred stock and a dividend of 1 per cent. on the common stock.

The Alabama Steel & Shipbuilding Company have declared the regular 3 per cent. semiannual dividend on the preferred stock.

The Chicago Pneumatic Tool Company have declared the regular quarterly dividend of 2 per cent., payable January 15.

Trade Catalogues.

The Station Equipment Company, Marquette Building, Chicago, have issued list No. 37, relating to dynamos, engines and boilers, which are offered for immediate delivery. The company make a specialty of the sale of electrical and steam apparatus which has been taken out of service as a result of consolidation or replaced by larger units.

The Cedar Rapids Pump Company, Cedar Rapids, Iowa, have issued a pamphlet entitled "Pump Beauties," illustrating the various makes of their improved wind mill pump standard. A price-list and dimensions of set length pumps

Edward C. Pope of Cleveland, for many years connected with the iron ore interests of that city, died at his home in East Cleveland, December 13. Mr. Pope was secretary-treasurer of the Permanent Rail Joint Company of Cleveland; he was a Mason, and the funeral was conducted by that organization. F. A. Pope of Otis, Bonnell & Co., Cleveland, and George W. Pope, sales agent for the Buckeye Engine Company, Salem, are sons of the deceased.

Matthew C. Reddin, president of the Reddin Iron Works Company, Syracuse, N. Y., died on December 17 at his home in that city, aged 44 years. Mr. Reddin, who was born in Orville, N. Y., went to Syracuse about 18 years ago and became foreman of the foundry department of the E. C. Stearns Company. Later he was one of the firm of Brown, Laycock & Reddin, operating the Economy Foundry, and seven years ago he started the Reddin Iron Works, building up a flourishing business.

James Marshall, who for 32 years was manager for the Crane Company, Chicago, died December 14. Mr. Marshall was born at Pittsburgh, Pa. He served in the War of the Rebellion in the Fourth Ohio Cavalry and received wounds at Chickamauga.

The Pressed Steel Car Company of Pittsburgh announce a reorganization of the sales department. O. C. Gayley, lately with the Pintsch Light Company, has been appointed manager in the eastern district, with headquarters in New York; C. E. Postlewaite, in the central district, with headquarters in Pittsburgh; J. H. Mitchell, in the western district, with headquarters in Chicago. A new office has been created, assistant to the president, and F. H. Rapley appointed. He was formerly resident engineer of the company in London. The output of steel cars in December at the different works of the Pressed Steel Car Company in the Pittsburgh district will be much larger than in any one month in the history of the company. It is expected that the output will show an average of more than 100 steel cars constructed for every working day in the month.

The Iron and Metal Trades.

There has been some discussion lately on the prices for Lake Ores for the season of 1903-1904, it being understood that the outside interests are urging a higher range of values. The Steel Corporation, however, appears to be wedded to the policy of keeping prices down to the present level, and it is pointed out that constant restriction of production in recent months through the fuel troubles has led to larger accumulations of Ore than were planned for.

In Pig Iron, one of the most conspicuous features is that foreign Iron has been offering at considerably lower prices, Middlesbrough No. 3 being available at $16.75, duty paid, in cargo lots, cash against documents. It appears that such a figure is due to special circumstances and that the weakness may be only temporary. Some cargoes are afloat which were shipped at a venture by interests not directly connected with the trade. Still it is somewhat surprising that the large purchases for this country have not steadied the English market more. The reports from Germany indicate a pretty serious condition of affairs in the Iron industry, while complaints from Belgium are persistently heard. Reports in the German newspapers state that the leading German Pig Iron syndicate is considering the question of handling all export sales jointly, in the same manner as is done for the home market.

In Chicago a considerable demand for Malleable Iron for quick delivery has developed, and Cast Iron Pipe interests are endeavoring to cover a considerable tonnage for the first quarter. In Pittsburgh about 20,000 tons of Bessemer Pig has been sold at full figures.

A moderate amount of tonnage is being placed in foreign Steel Billets, the price for fair blocks being $27.50 to $27.75, ex-ship, duty paid.

Further good orders for Structural Material have been placed in Chicago, Cleveland and New York, and some Ship Plate orders have been given out in Cleveland.

In the West some large contracts for Soft Steel Bars have been secured, one of them calling for 10,000 tons. Iron Bars are still selling by independent mills in the Chicago district at 1.75c. to 1.80c., while the large companies are asking higher prices.

There has been some talk again of an adjustment of the differences between the warring parties in the Montana Copper industry, but well informed interests do not take them seriously.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Dec.24, 1902.	Dec.17, 1902.	Nov.26, 1902.	Dec.25, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	$23.00	$23.00	$23.50	$15.75
Foundry Pig No. 2, Southern, Cincinnati	22.00	22.00	22.25	14.25
Foundry Pig No. 2, Local, Chicago	23.00	23.00	23.00	15.50
Bessemer Pig, Pittsburgh	*21.25*	22.00	21.75	16.50
Gray Forge, Pittsburgh	*20.25*	20.50	20.75	15.25
Lake Superior Charcoal, Chicago	*25.00*	25.00	26.00	18.50
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	**29.00**	29.00	28.50	27.00
Steel Billets, Philadelphia	**27.00*	**27.00*	**26.00*	29.50
Steel Billets, Chicago	**29.50*	**29.50*	**29.60*	....
Wire Rods, Pittsburgh	*34.50*	34.50	35.50	34.25
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	18.75	18.75	18.75	14.00
O. Steel Rails, Philadelphia	21.00	21.00	21.00	18.00
O. Iron Rails, Chicago	*24.00*	24.00	24.50	21.00
O. Iron Rails, Philadelphia	24.00	23.50	24.00	21.50
O. Car Wheels, Chicago	24.00	24.00	24.00	16.00
O. Car Wheels, Philadelphia	20.00	20.00	20.00	16.75
Heavy Steel Scrap, Pittsburgh	21.50	21.00	....	....
Heavy Steel Scrap, Chicago	*18.25*	18.25	18.50	13.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.92	1.92	1.92½	1.65
Common Iron Bars, Chicago	1.75	1.75	1.75	1.65
Common Iron Bars, Pittsburgh	1.70	1.70	1.70	1.50
Steel Bars, Tidewater	1.75	1.75	1.75	1.70
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.10	2.10	2.10	1.75
Tank Plates, Pittsburgh	1.75	1.85	1.85	1.60
Beams, Tidewater	*1.90*	2.00	2.00	1.75
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Angles, Tidewater	*1.90*	2.00	2.00	1.75
Angles, Pittsburgh	1.90	1.90	1.95	1.60
Skelp, Grooved Iron, Pittsburgh	1.90	1.90	1.92½	1.75
Skelp, Sheared Iron, Pittsburgh	*2.00*	2.00	2.05	1.80
Sheets, No. 27, Pittsburgh	2.65	2.65	2.65	2.90
Barb Wire, f.o.b. Pittsburgh	2.45	2.45	2.45	2.90
Wire Nails, f.o.b. Pittsburgh	1.85	1.85	1.85	1.95
Cut Nails, Mill	2.05	2.05	2.05	2.05
METALS:				
Copper, New York	**11.65**	11.65	11.25	12.00
Spelter, St. Louis	*4.45*	4.60	4.87½	4.15
Lead, New York	4.10	4.10	4.10	4.00
Lead, St. Louis	3.97½	3.97½	3.97½	3.95
Tin, New York	**25.95**	25.75	24.25	23.30
Antimony, Hallett, New York	*7.12½*	7.12½	7.25	8.25
Nickel, New York	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.79	3.79	3.79	4.19

* Foreign.

Chicago.

FISHER BUILDING, December 24, 1902.—(*By Telegraph.*)

Interest in the Pig Iron market centered in the demand for Malleable Iron for quick delivery, not a few of the local founders being compelled to cover immediate wants arising from delinquent shipments and the congestion of freight which exists at this point as well as in the South and East. Another interesting point is that Heavy Cast Iron Pipe interests are in the market for a considerable tonnage, from 10,000 to 15,000 tons of Foundry grades, for delivery during the first quarter of 1903. One of the most prominent features of the week has been the revival of the demand for Soft Steel Bars and some little improvement also for Bar Iron. This department of the market has for two months or more been dragging, and hence the improvement is worthy of more than passing note. The demand for domestic Rails continues active, although no large contracts have resulted from the negotiations during the past week. The large tonnage of foreign Steel for Pacific Coast points is still pending. The increased demand for Structural Material, a considerable tonnage having been placed during the week, is also a feature of interest. The renewal of contracts for Machinery, Tire and Spring Steel has also been a new development. The same is true of Crucible Tool Steel. Much interest centers in the Coke outlook, prompt deliveries being interfered with by traffic congestion and contracts for the whole of 1903 engaging the attention of most furnaces. Lower prices have been made in some instances, but there is much more tonnage seeking lodgment. At the close there seems to be a wide variation between ovens and consumers.

Pig Iron.—The character of the Pig Iron market has not changed essentially during the week. The tonnage placed

has been small, confined almost entirely to the covering of early requirements made necessary by delinquent shipments. Local furnaces are still disabled from lack of Coke and prices on local Foundry Iron for early delivery are entirely nominal. While the market for No. 2 Southern Foundry for shipments beginning in January ranges from $19 to $20, Birmingham, there have been small sales for shipment before the first of the year, to take advantage of freight rates, at prices ranging from $20 to $22, Birmingham. But by far the most important movement of the week has been in Malleable Iron, Malleable founders covering early wants by purchasing Valley Iron for quick shipment at prices ranging from $24 to $24.60, Chicago; but for extended deliveries it is difficult to obtain over $21 at the Valleys, which means $23.10, Chicago. The most serious condition having an important bearing on the marekt is the congestion of freight at this point, one large road having an accumulation of 3600 cars in the yards and little headway being made against the accumulation. It is almost impossible to get Coke from the snarl of cars. Charcoal Iron is scarce, but Southern Silvery Iron is in more ample supply, while Jackson County and Kentucky Silvery is very difficult to obtain even at the high prices demanded. The following are the prices current for deliveries beginning in January:

Lake Superior Charcoal	$25.00 to $26.00
Local Coke Foundry, No. 1	23.50 to 24.00
Local Coke Foundry, No. 2	23.00 to 23.50
Local Coke Foundry, No. 3	22.50 to 23.00
Local Scotch, No. 1	24.00 to 24.50
Ohio Strong Softeners, No. 1	27.50 to 28.00
Southern Silvery, according to Silicon	26.15 to 29.15
Southern Coke, No. 1	23.65 to 24.15
Southern Coke, No. 2	23.15 to 23.65
Southern Coke, No. 3	22.65 to 23.15
Southern Coke, No. 1 Soft	23.65 to 24.15
Southern Coke, No. 2 Soft	23.15 to 23.65
Foundry Forge	22.15 to 22.65
Southern Gray Forge	19.15 to 19.65
Southern Mottled	19.15 to 19.65
Southern Charcoal Softeners, according to Silicon	27.15 to 27.65
Alabama and Georgia Car Wheel	29.15 to 29.65
Malleable Bessemer	23.50 to 24.00
Standard Bessemer	24.00 to 24.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	31.00 to 32.00

Bars.—There has been a decided improvement in the demand for Soft Steel Bars, one or two large orders having been placed durnig the week—one contract for 10,000 tons for immediate shipment and one for 5000 tons for delivery in the early part of 1903. There has also been increased specifying on old contracts, which is the most encouraging feature that has been developed for many months. One or two 1000-ton lots have also been sold during the past two days. Bar Iron has also shown some little improvement, wagon manufacturers being in the market for 500 tons and railroads desirous of covering the needs for 2000 cars; but with mills ready and anxious for business prices have not changed essentially. The following are the prices current: Bar Iron, 1.75c. to 1.80c.; Soft Steel Bars, 1.75c. to 1.80c.; Hoops, 2.15c. to 2.25c.; Angles, 1.85c. to 1.90c., base, mill shipment. But few orders have been received by merchants and prices have remained nominally unchanged, Bar Iron selling at 2.15c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.40c., base, from store.

Structural Material.—There has been a more active demand for Beams, Channels and Angles, sales during the week aggregating about 10,000 tons for shipment during the first half of 1903; 2500 tons of Angles have also been sold for early shipment. There has continued to be a fair inquiry for foreign material, with sales of several hundred tons during the past few days. For domestic Steel, mill shipment, prices are as follows. Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. The demand from local stocks has been fair and readily met at the following prices: Beams and Channels, cut to length, 2.50c. to 3c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—The market has been quiet, but with the mills well sold for the first half of 1903 the situation has been unchanged. The following are the prices current, mill shipment: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 2.10c. to 2.20c. The movement from local yards has been on a moderate scale, but prices have remained steady, as follows: Tank Steel, ¼-inch and heavier, 2.25c. to 2.35c.; Tank Steel, 3-16-inch and No. 8, 2.30c. to 2.45c.; Flange, 2.50c. to 2.60c., all f.o.b. warehouse, Chicago.

Sheets.—There has been some little improvement in tone with some increase in the volume of business, but prices have not changed essentially. The following are the official prices for Black Sheets, mill shipment, carload lots, f.o.b. Chicago: No. 20, 2.55c. to 2.60c.; Nos. 22 and 24, 2.60c. to 2.70c.; No. 26, 2.70c. to 2.80c.; No. 27, 2.80c. to 2.90c.; No. 28, 2.90c. to 3c. Galvanized Sheets have sold at a discount of 75 and 10 on the base price. The following are the net prices: No. 27, 3.25c. to 3.50c., for mill shipment, and small lots from store at 3.40c. to 3.65c., Chicago.

Cast Pipe.—The market has been quiet but steady, with a fair inquiry for moderate amounts of the smaller sizes. Manufacturers sell small lots at the following prices: 4-inch, $36.50 to $37; 6-inch, $35.50 to $36; 8-inch and upward, $34.50 to $35; Gas Pipe, $1 per ton higher, f.o.b. Chicago.

Billets.—The market has been quiet, with a moderate inquiry for domestic and with less animation in foreign Steel, but sales of 2000 tons of the latter have been made during the week. Prices have continued to range from $27 to $28 on the Atlantic seaboard and $29.50 to $30, duty paid, delivered at points in this section. Domestic Open Hearth Billets have continued to sell in a moderate way at prices ranging from $36 to $40, according to analysis, buyer and time of delivery. Rerolling Bessemer Billets are entirely nominal at $30 to $31.

Merchant Pipe.—The volume of business transacted in December shows a decided improvement over the corresponding month a year ago. Otherwise the market is without new features or special activity. The following are the official prices, Chicago, base, random lengths, for mill shipment, carloads only:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black. Per cent.	Galvd. Per cent.	Black. Per cent.	Galvd. Per cent.
⅛ to ⅜ inch	66½	56½	63½	53½
½ inch	68½	58½	65½	55½
¾ to 6 inches	73½	63½	70½	60½
7 to 12 inches	71½	61½	68½	58½

Boiler Tubes.—There has been a quiet but steady market and the following table of discounts is subject to an additional discount of 5 per cent. in special instances for mill shipment:

	Steel.	Iron.
1 to 1½ inches	43½	38
1¾ to 2½ inches	56	36
2¾ to 5 inches	61	46
6 inches and larger	56	36

Business for shipment from local stocks has been moderate and the schedule of prices has been unchanged, although in some instances 5 per cent. additional has been granted in prices in the following schedule:

	Steel.	Iron.
1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—The market has been without special activity, although there has been a fair carload business in Machinery, Tire and Spring Steel. The important mills making these grades of Steel are sold for the first six to eight months of 1903. There has been considerable activity in Crucible Steel in the way of renewals of contracts for next year. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.95c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 47 off in carload lots and 42 off in less than car lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 8c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—There has continued to be an active inquiry for both Standard and Light Sections, but the negotiations have resulted in only moderate sales, the local mill being sold into December, 1903, taking few orders. About 6000 tons of Standard Sections have been placed from this territory with Eastern mills. Official prices for domestic Rails remain unchanged at $28 for standard and $27 for second quality, mill shipment. Light Rails have continued to range from $35 to $45, according to weight. The demand for Track Supplies has continued active and the market firm, as follows: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—There have been few buyers in the market for light material and the market has been a little easier in tone, but there has been no pressure to sell and prices have been well sustained. For heavy material there is a fair outlet and prices are firm. Old Car Wheels are especially strong and wanted; Relaying Rails are in more ample supply and easier. The following are the prices per gross ton, Chicago:

Old Iron Rails	to $24.00
Old Steel Rails, mixed lengths	$18.75 to 19.00
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	31.50 to 32.00
Old Car Wheels	24.00 to 25.00
Heavy Melting Steel Scrap	18.25 to 18.50
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	to $22.00
Iron Car Axles	$24.50 to 25.00
Steel Car Axles	23.50 to 24.00
No. 1 Railroad Wrought	19.50 to 20.00
No. 2 Railroad Wrought	17.50 to 18.00
Shafting	20.00 to 21.00
No. 1 Dealers' Forge	16.00 to 16.50
No. 1 Busheling and Wrought Pipe	14.00 to 14.50
Iron Axle Turnings	to 15.00
Soft Steel Axle Turnings	14.50 to 14.75
Machine Shop Turnings	13.50 to 14.00

Cast Borings	10.00 to	10.25
Mixed Borings, &c	10.50 to	11.50
No. 1 Boilers, cut	14.50 to	15.00
Heavy Cast Scrap	17.50 to	18.00
Stove Plate and Light Cast Scrap	14.00 to	14.50
Railroad Malleable	16.25 to	16.50
Agricultural Malleable	15.75 to	16.00

Metals.—The market has continued quiet throughout the week, but prices have remained steady. Lake is offered at 11½c. in carload lots and 11¾c. in less than carload lots. Pig Lead has continued firm, with fair volume of business, 4.05c. in 50-ton lots, 4.07½c. in carload lots and 4.10c. in a jobbing way. Sheet Zinc has been quiet and easier at 6¼c. in lots of 600 lbs. and over. Old Metals have been slow and barely steady, as follows: Heavy Cut Copper, 10¼c.; Red Brass, 10¼c.; Copper Bottoms, 9¼c.; Lead Pipe, 3.90c.; Zinc, 3.80c.

Coke.—The situation is difficult to analyze and many dealers are at sea as to the outlook. The congestion of local freight is sadly interfering with the obtaining of supplies now on track and higher prices have been demanded in some instances, but the little Standard Foundry sold has brought $10 per ton on track. Some second quality sold at $7.50 per ton spot. A number of contracts for Furnace Coke for delivery during 1903 are reported to have been made at prices ranging from $2.75 to $3.50, at the ovens, and there are more buyers in the neighborhood of $3. On the other hand, contracts have also been made as high as $4. A canvass of the situation by competent authorities reveals the fact that about 15,000 new ovens have been projected and will be supplying Coke during 1903. Six thousand eight hundred of these ovens are assured by July 1.

A. M. Crane & Co., Incorporated, have been appointed Western selling agents for the C. Pardee Works, Perth Amboy, N. J., manufacturers of Steel Shafting.

It is announced that the Martell Furnace, St. Ignace, Mich., having a capacity of 75 to 80 tons Charcoal Iron, will blow in early in January. H. A. Forsyth, Monadnock Block, Chicago, is selling agent.

Theodore Geissman, Monadnock Block, Chicago, has been appointed Western representative of the Pittsburgh Steel Shafting Company of Pittsburgh.

Cincinnati.

FIFTH AND MAIN STS., December 24, 1902.—(*By Telegraph.*)

In that the Pig Iron market is no weaker it supports the claim made by some authorities that lower prices must not be looked for just yet. While authorities reaffirm the exceptionally low sale of Mill Iron quoted in last week's *Iron Age*, it is nevertheless true that there has been a strong reaction in those grades and no such prices are now given out. The lowest figure given out at this time is the basis of $15.50, Birmingham, for Gray Forge and Mottled. Foundry Irons are quite steady and, as far as the lower grades are concerned, are stiffer in price. Of course there is but very little trade current and a large proportion of what there is could hardly be accepted as a criterion as to prices when the buying movement becomes general. There is no business doing for the last half of the year and the only quotation obtainable is on offerings on the basis of $18, Birmingham. Freight rate from the Hanging Rock district $1.10 and from Birmingham to Ohio River points $3.25. We quote, f.o.b. Cincinnati, for delivery to July 1, 1903, freight rates only guaranteed to March 1, as follows:

Southern Coke, No. 1	$23.25 to	$24.50
Southern Coke, No. 2	22.25 to	23.75
Southern Coke, No. 3	20.75 to	21.75
Southern Coke, No. 4	19.25 to	20.75
Southern Coke, No. 1 Soft	23.25 to	24.50
Southern Coke, No. 2 Soft	22.25 to	23.75
Southern Coke, Gray Forge	18.75 to	19.25
Southern Coke, Mottled	18.75 to	19.25
Ohio Silvery, No. 1	30.60 to	32.10
Lake Superior Coke, No. 1	25.10 to	26.10
Lake Superior Coke, No. 2	24.60 to	25.10
Lake Superior Coke, No. 3	23.10 to	24.10

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$27.75 to	$28.75
Lake Superior Car Wheel and Malleable	27.50 to	28.50

Plates and Bars.—The market is seasonably quiet and unchanged. We quote as follows: Iron Bars in carload lots, 1.92c., with half extras; same, small lots, 2.20c., full extras: Steel Bars, carload lots, 1.72c., with half extras; same, small lots, 2.20c., full extras. Plates are quoted nominally, ¼-inch, in carloads, 1.70c.; same, 3-16, 1.80c. As a matter of fact, however, mills having Plates to ship are getting 2.15c. without trouble. I-Beams and Channels, 1.70c., base. All prices f.o.b. Cincinnati.

Old Material.—We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $20 per net ton; Cast Scrap, $16.50 to $17 per net ton; Iron Rails, $24.50 to $25, gross; Steel Rails, long, $23.50, gross; same, short, $18, gross; Iron Axles, $26.50, gross; Car Wheels, $21, gross.

St. Louis.

CHEMICAL BUILDING, December 24, 1902.—(*By Telegraph.*)

Pig Iron.—The closing of the year in the Pig Iron market shows a very quiet condition of trade. The tone of the market is very strong, and prices are very firm and well maintained. All leaders in the market at this center take a very hopeful view of future business prospects. Prices are unchanged since our last report, and we quote, f.o.b. St. Louis

Southern, No. 1 Foundry	$24.25 to	$25.25
Southern, No. 2 Foundry	23.25 to	24.25
Southern, No. 3 Foundry	22.75 to	23.75
Southern, No. 4 Foundry	22.25 to	23.25
No. 1 Soft	24.25 to	25.25
No. 2 Soft	23.25 to	24.25
Gray Forge	22.25 to	23.25
Southern Car Wheel	.... to	....
Malleable Bessemer	.... to	....
Ohio Silvery, 8 per cent. Silicon	.... to	....
Ohio Strong Softeners, No. 1	.... to	....
Ohio Strong Softeners, No. 2	.... to	....

Bars.—Jobbers report a continuance of the very fair trade for Iron and Steel Bars with considerable new inquiry still showing. We quote from the mills: Iron Bars at 1.85c. to 1.95c., Steel Bars at 1.80c. to 1.90c. Jobbers quote Iron Bars at 2.25c. and Steel Bars at 2.25c., from store in small lots, 2.15c. in larger quantities.

Rails and Track Supplies.—No let up in the volume of demand for Rails and Track Supplies is reported, and this department of the market can be said to lack any new feature of particular interest. We quote as follows: Splice Bars, 2.10c.; Bolts, with Hexagon Nuts, 3.25c. to 3.30c.; with Square Nuts, 3c. to 3.10c.; Spikes, 2.60c. to 2.75c.

Angles and Channels.—A moderate volume of demand still rules in the market for small Angles and Channels, and jobbers' quotations are generally unchanged. For material of this class 2.50c., base, is asked.

Pig Lead.—No new features of importance come to light in the Pig Lead market, and conditions continue to show firmness. We quote Chemical at 3.97½c. to 4c., and Desilverized at 4.02½c. to 4.05c.

Spelter.—Business in the market for Spelter is not very brisk at this time, but prices rule fairly steady. We quote 4.65c. to 4.75c.

Cleveland.

CLEVELAND, OHIO, December 23, 1902.

Iron Ore.—The figures have just been compiled showing the total movement of Iron Ore from the Lake Superior region during the year ending December 15. This indicates a total movement for the year, including the all rail, the lake and rail and the shipments from Michipicoten of 27,800,000 tons. There has been some talk of late of the rates of carriage for next year, and the question is now being discussed of fixing them at 85c. from the head of the lakes with corresponding rates from the other ports. The shippers are disposed to grant a certain increase, realizing that the expenses of operating the boats are higher. The inwardness of their concession, however, is that the ratio of the tonnage to the material to be moved is such as to indicate that the shippers may not have dictatorial power another year.

Pig Iron.—The situation in the foundry grades during the last week of the year commends itself to the trade in general as rather hopeful. It is true that for the present the buying is somewhat limited, but the beginning of the year will discover a vast amount on the books for delivery this year which has not been delivered. The estimates of the amount vary greatly, but it is evident that a good part of the output for the first two months at least will be consumed with shipments on 1902 contracts. It is beginning to look much as if with the carried forward orders, and with those which are already in, there might be quite as serious congestion at the furnaces for the first half of this year as during any period for the last few months. This has brought up the question of whether or not there is possible any increased movement of foreign iron into this territory. It is confessed that such a thing seems altogether possible and even very probable, although there has been no definite step along that line. It is a notable fact that the operation of a number of the foundries in this territory during the last few months has been permissible only through the importations of Nova Scotia or Scotch Irons. The sole hope of the foundries in this territory seems to be founded upon the possible continuance of the furnaces in blast without interruption. If the stacks can be kept going without the slightest hindrance it is possible that the supply of Pig Iron for the first half of the coming year may be sufficient. The worst of the Coke shortage is ahead beyond question, which fact is recognized by the railroads, the Coke makers and the furnacemen themselves. There seems to be no possible relief. The only thing that could possibly assist the furnacemen would be a dry, warm winter, and this is not expected. In a good many instances railroad equipment has been exhausted

by the heavy strain of the summer, and engines are being sent daily to the shop for a general overhauling. These are being replaced by engines just from the shop, of equal power, and while this ought to relieve the situation somewhat, it is evident that there is a reduction of at least ten cars in the size of every train, which is decreasing the Coke supply very materially. As this reduction is being made because of the cold weather, a restoration of the full sized train need not be expected until after the winter has gone or at least until the middle of next March. The price for No. 2 Foundry is $23 for first half and $21 second half. The Bessemer and the Basic producers are waiting. They have, perhaps, some uncovered capacity for the first half of the year, but at present do not know how extensive it will be. Until this is developed they will make no sales.

Finished Iron and Steel.—The market during the past week has taken on a very hopeful turn. There is not quite so much interest in the market for the smaller mills, but the larger ones have been enjoying a season of activity which is quite refreshing. This is in part due to the change in the money market. In all trades a short time ago there was a certain suspension of shipments, by order from the consumers, because of the stringency in the money market. The latest reports have it that these suspensions have been withdrawn and the movement is proceeding. This, coming with the heavier specification on all contracts for heavy Steel, makes a much better market all the way through. The leader of the week seems to have been Structural Steel. One concern have purchased through a Cleveland office 5000 tons of Structural Steel for delivery during the first half of the year. It is also learned that there have been two new ship orders with the American Ship Building Company, which will take a certain amount of Finished Steel both of Plates and Shapes. The general market is accordingly looking up and it seems now as if there would hardly be much more material left for shipment during the first half. The orders, which probably take up two-thirds of the season, are scattered so well through the year that a good deal of material can be sandwiched in here and there. The demand for material for quick shipment, while it has eased up greatly, has not disappeared entirely. The jobbers and the small producers are therefore getting their due proportion of the business. The smaller mills are not so loud in their demand for premiums just now and appear to be satisfied with the quotation of 2c. to 2.25c., while the jobbers are getting 2.25c. to 2.50c. without much difficulty. It is evident that no great amount of business is being contracted at these figures. All such sales are for spot shipment. There is such an easing up in some parts of the Plate trade for immediate shipment that some have believed that the top notch of prosperity has been reached. A careful analysis of the market, however, indicates that this is merely a surface display and temporary at best. It must be admitted that until this week the experience of the Steel makers might have caused them to regard the market with some degree of suspicion, since the suspensions of shipments had been rather serious and perhaps alarming. While the buying for immediate use may have declined in sympathy with the near approach of invoice time, the heavy specifications on old contracts for filling past the first of the year make it altogether possible that the business as contracted for will continue to the end with a rush. There have been no new sales of importance of late, but these are not needed for a strong market, since much heavier buying would embarrass the mills all the way through by making deliveries precarious. The smaller mills have been subdued by the market conditions lately and are now content with quoting 1.75c. to 2c., Pittsburgh, for spot delivery. The larger mills on sales now made are commanding the association price of 1.60c., Pittsburgh. The Bar Iron trade seems to have taken a sudden brace, verifying the indications of a week ago that the market seems promising after the first of the year. The market heard this week of an inquiry for 1000 tons of Bar Iron for delivery soon after January 1. It is understood that 1.70c., Pittsburgh, is the basis for contracts after the first of the year. There is still a strong demand for Steel Bars of the Open Hearth grade. The quotations have not changed from 1.60c., Pittsburgh, for Bessemer and 1.70c., Pittsburgh, for Open Hearth. There is a continued weakness in Sheets, with, however, the prospect of a good demand immediately after the middle of January, when a resumption of full activity is expected. At present the material seems to be a drug on the market, with an enormous production and few buyers. The prices asked by the jobbers are still 3.10c. to 3.25c., out of stock, for No. 27, with mill sales made on the basis of 2.85c. to 2.95c. for No. 27. The Billet situation has been stronger within the last week and there is a better demand for Bessemer, with a good call for Open Hearth, but without the material with which to make reply. The prices range about $31 for Open Hearth and $30 for Bessemer.

Old Material.—The market has been easy, with prices on the down grade, and yet without any breaks so far as known. The quotations are continued as follows: No. 1 Wrought, $19, net; Iron Rails, $25.50, gross; Iron Axles, $28, net; Cast Borings, $12, gross; Car Wheels, $22.50, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

Philadelphia.

FORREST BUILDING, December 22, 1902.

The Iron market has not been very active during the past few days, as there is a general disposition to clean up for the holidays. There is a better undertone, however, and if it was at any other time in the year a good deal of activity and some improvement in prices might be expected. As it is, however, extensive operations will probably be held in abeyance until after the holidays, but there is no doubt that there is a much better feeling than there was two or three weeks ago. Whether this will be maintained until after the holidays will probably depend upon a variety of circumstances, which at the moment cannot be definitely estimated, but, as already stated, the feeling is hopeful.

A good deal of Pig Iron has been sold during the past few days, not very large lots, but a good many lots, and almost every consumer seems to want something and is perfectly willing to pay quoted rates to get it. The continued pressure of foreign checks any movement toward higher prices, but the events of the past few weeks have developed the fact that prices are on a pretty solid foundation at the present time and it is believed that they will not show much change during the first quarter of the year, with a reasonable possibility that they may continue until midsummer. A great many things may occur during that period, however, but as far as can be seen at the present time the chances for a steady market are reasonably safe.

In the Finished Iron and Steel trades the feeling is very similar to that in raw material. There has been enough buying during the past few days to impart a good deal of confidence to mill owners, although the probabilities of higher prices are hardly as good as could be desired, notwithstanding the fact that the margin is not by any means what it ought to be. For the present, however, there is a pretty good prospect for a large volume of business and it is hoped that prices will improve accordingly.

There is a more cheerful feeling in Old Material and better prices are paid than could have been had a week ago. Yards are bare of stock and a good deal of material will be wanted to begin work with when the mills start up after the holidays.

Birmingham.

BIRMINGHAM, ALA., December 22, 1902.

The market is not firm all along the line this week. There are weak spots and buyers have found them and have taken the offerings. There was no announcement here of the sale of Gray Forge at $14 and less, and the statement to that effect made by *The Iron Age* was received with incredulity. While your correspondent cannot vouch for it by authority, he is thoroughly satisfied that the statement is correct. From all the information available, the conclusion is that the sale was not made by the Birmingham district proper, but was made for account of other districts in Alabama and wrongly credited to this district. Your correspondent knows that $15 has been repeatedly refused by interests in this district, deliveries in some instances to extend over a good portion of the coming year. There were spot sales of this grade reported at $16.50, and some sellers declined quoting under $18 to $18.50. There was no business at the extreme figures. The sales quoted by *The Iron Age* were a complete surprise to the trade here. Why they should be heralded at other points and suppressed here is one of those things that concern only the principals to the trade. The parties to the trade are known by common consent, but their desire to remain "incog" is respected. It has leaked out that there have been other sales at $15 for smaller lots during the past 30 days; but in every case they were made "under the rose," and though effected right under our noses we have been compelled to go from home to get the news. The quotation of $20 for No. 2 Foundry is adhered to by the majority of sellers for the first half of 1903. Just now the sales for the last half of the year do not cut much figure. Neither side is rushing business for that delivery. Considering the season of the year, the inquiry for the week was very fair. There has been no relief yet from the piling up of Iron. It still continues to the annoyance and chagrin of the furnace interests. Shipping conditions are improving so slowly that the relief, if any, is infinitesimal. When you hear of any movement in, or of, Iron you will know the relief promised has come.

Articles of incorporation of the Desoto Coal Mining & Development Company were filed the past week. The company are capitalized at $250,000, the incorporators being B. C. Stevens, C. T. Robinson and Hume T. Jones. They will mine and sell Coal, manufacture and sell Coke, operate saw mills, &c. John Dowling, who has for some time past been manager of the Trussville Furnace for the Lacey-Buek Company, has resigned his position to go with the Valley

Company, and will have much to do with the building of that plant. News comes to us of the blowing in of the large recently constructed furnace at Anniston, belonging to the Woodstock Furnace Company. The capacity of the furnace is put at 300 tons, and it is fitted with all the modern appliances.

The report of the Car Service Association shows a material increase in the number of cars handled for November over that month last year, and the increase in bank clearings keeps it company in recording the expansion of business.

The furnace practice of the district has been and continues to be very satisfactory and they are all being operated for best possible results. There is no material improvement in the situation as to Coal. Cars are yet scarce and business is dependent upon their supply. The advent of the Christmas holidays will not bring any relief. The price is whatever you ask; and $2 at the mines is no unusual occurrence if the buyer can find a seller not loaded up with contracts that have penalties attached for non-delivery. And Coke is not in any better condition. The writer saw the sales record of one shipment at $7.50. The buyer was not a furnace. It is hard to quote accurately and the figures named for it run from $6.50 to $7.50. Buyers say it costs now about $7.50 to lay down here Virginia Coke if one had to buy it at the market. But this condition of things will soon be remedied, as various plants of Coke ovens are nearing completion. There are yet some large deals on the carpet about which nothing can yet be said.

The French Iron Market.

PARIS, December 4, 1902.

The strike of the miners is now completely ended without having led to any satisfactory results for the workmen. Still it has caused considerable losses for the collieries, for the miners and for national production. For the principal Coal districts of France—the Nord and Pas-de Calais, the Loire and the Tarn—the length of the strike may be placed at about 38 days. It has involved 120,000 miners out of a total of 160,000 in France. Considering that the number of men in the Pas-de-Calais and Nord districts is 87,000 and that their average wages are 4.85 francs per day, the losses involved for them are 13,000,000 francs in round numbers. There are 20,000 miners in the Loire district, earning an average of 4.65 francs, so that the loss there is close to 3,000,000 francs. In the Tarn district there are not more than 5000, who earn on an average of 4.30 francs per day. Altogether the loss of wages foots up close to 7,000,000 francs. The companies, too, have lost about 12,000,000 francs. So far as losses to national industries are concerned, it cannot have been less than 50,000,000 francs.

While the resumption of work at the collieries has made it possible to start again the rolling mills closed down by the fuel famine, that does not revive the demand for Iron and Steel products, which still languishes. It is certain, besides, that the unfavorable condition of the finances of the State have adversely influenced the general business situation. The deficit of the budget is enormous and an effort is being made to lower it by cutting off expenses. Thus the outlays for material for the War and Navy departments are being held back. The building of cruisers and battle ships, which was resumed in accordance with a vote of the Chamber, has been suspended. In order to equalize the budget it has been necessary to resort to a heavy loan of about 1,000,000,000 francs. This would be only accepted if it served to sustain industry and to develop the economic resources of our country.

The work in sight is small and our Iron plants are very anxious for employment. It seems as though there is quite a good deal coming up from Madagascar. The Fives-Lille Company have been awarded the contract for an Iron bridge over the Pei-Ho in China, a real success for our industry. So far as our foreign commerce is concerned, we may note that the total imports of Pig Iron, Iron and Steel during the first ten months of 1902 have figured up 146,531 tons, a falling off of 18,703 tons as compared with the corresponding period of 1901. The exports have risen to 398,344 tons, an increase of 175,402 tons over 1901. In the totals for the ten months of 1902 of exports are included 84,475 tons under the drawback system.

At Paris the amount of business is very small and quotations tend downward. Thus sales of Merchant Bars are noted below 16 francs and Beams below 17 francs. In the Northern Department the works are poorly employed. The important Denain and Anzin works, as well as other plants in the Valenciennes and Maubeuge districts who were idle during the strike, are running very slowly and only during a part of the week. In spite of this no complaints of delays in deliveries are heard, which proves that consumption is very low. Merchant Bars are selling without change at about 15.50 francs. In the Ardennes district the situation is beginning to give rise to serious uncertainty as to the winter season. There is little employment in sight and raw materials are very high. Bars are selling at 16 francs per 100 kg., but for important specifications 15.75 francs, and even 15.50 francs, are readily obtained. In the Loire district, in the center of France, reports are not very much more encouraging. In all the departments, in forges, Steel works and finishing mills, the situation remains deplorable. Bars are quoted at 18 to 18.50 francs for first-class. No. 1 Beams are 19.50 to 20 francs per 100 kg. and Steel Beams .. to 19.50 francs per 100 kg.

New York.

NEW YORK, December 24, 1902.

Pig Iron.—Interest centers in the offerings of foreign Foundry Irons, which have become somewhat urgent. It appears that there are cargoes afloat which were purchased at a venture, and which cannot be at once placed. Reports have been current of considerable inquiries for foreign Spiegeleisen, but the principal buyers profess ignorance of them. Northern Iron, at tidewater, No. 1 X, $24.50 to $25; No. 2 X, $22 to $22.75; No. 2 Plain, $21.50 to $21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, $24.50 to $25.50; No. 2 Foundry $22.75 to $23.25; No. 3 Foundry, $21.75 to $22.50.

Steel Rails.—The market is very quiet, and no large orders have been recently placed with the domestic mills. There are some inquiries in the market for German Rails, some of them emanating from the Pacific Coast, but we cannot learn that any business of consequence has been done. We continue to quote $28 for Standard Sections at Eastern mill.

Cast Iron Pipe.—Quite a number of Pipe contracts have been let recently in various parts of the country, business being very much better than usual in December. This city will open bids on the 31st for 3800 gross tons of 4 to 30 inch for Brooklyn. The Pipe companies have had a very good year, which would have been still better if they had been able to get all the material they needed to enable them to run to full capacity. Prices quoted, at tidewater, are $34 for 6 to 12 inch, gross ton.

Finished Iron and Steel.—The American Bridge Company have secured the contract for a store building in Pittsburgh, 2000 tons; an office building in Chicago, 2500 tons, and a fair run of less important work. Their eye bar plant in their new works at Ambridge, Pa., will probably be started early in January if material can be secured for the purpose. These works are greatly needed by the company and they will put in operation each department as quickly as it is available. It will probably take the whole of the coming year to finish the works. The prospects for 1903 are very promising in the structural line generally. Some orders for Plates are being placed in this market, but as usual the demand is not heavy during inventory season. The Pennsylvania mills are still suffering from scarcity of Coal and are not running to their capacity. We quote at tidewater as follows: Beams, Channels and Zees, 1.90c. to 2.25c.; Angles, 1.80c. to 2c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2.10c. for Tank, 2.20c. for Flange, 2.35c. to 2.40c. for Fire Box. Refined Bars are 1.90c. to 2c.; Soft Steel Bars, 1.80c. to 1.90c. Foreign Beams are 1.75c., ex-ship, New York, in large lots.

Old Material.—While a little more business is reported in rolling mill stock, the market is comparatively dull. Selling quotations are as follows, per gross ton, f.o.b. cars in this vicinity:

Old Iron Rails	$22.00 to $22.50
Old Steel Rails, long lengths	20.00 to 20.50
Old Steel Rails, short pieces	18.00 to 18.50
Relaying Rails, heavy sections	29.00 to 30.00
Relaying Rails, lighter sections	33.00 to 35.00
Old Car Wheels	20.00 to 20.50
Old Iron Axles	25.50 to 26.00
Old Steel Car Axles	24.50 to 25.00
Heavy Melting Steel Scrap	18.00 to 18.50
No. 1 Railroad Wrought Scrap Iron	20.00 to 21.00
Track Scrap	18.00 to 18.50
Busheling Scrap	14.00 to 14.50
No. 1 Machinery Cast Scrap	19.00 to 20.00
Stove Plate	13.00 to 14.00
Wrought Turnings, delivered at mill	16.00 to 16.50
Cast Borings, delivered at mill	9.00 to 9.50

We have received from the Detroit Stove Works, Detroit, Mich., an exceptionally convenient diary or daily reminder. Although small enough to be carried in a vest pocket, it contains a few lines for memoranda for each day in the year, maps of the United States and its possessions, and a great deal of other useful commercial and general information.

The Jos. Joseph & Bros. Company, dealers in old material, 80 Broadway, New York, favor us with a unique wall calendar, bearing the traditional emblems of good luck fastened to an excellent reproduction of a barn door, part of the ornamentation appropriately suggesting the scrap trade.

Metal Market.

NEW YORK, December 24, 1902.

Pig Tin.—Speculative operations have continued, and prices are still artificially high. There was a lull last Friday, the support being withdrawn by the American operators, who had hoisted values. Immediately the market broke, but a well-known London operator stepped in and continued the upward movement. This market has moved in unison with the London fluctuations. On Friday last, when the break was most pronounced, spot went down to 25.57½c. here and £115 12s. 6d. in London. On Monday the renewed efforts of the manipulator resulted in a recovery of £2 15s. in London and prices here were put up to a basis of 26.05c. for spot, which was paid for a small lot. The closing prices for spot to-day named £118 15s. for spot and £119 for futures. At the close here prices were entirely nominal, ranging from 25.95c. to 26.15c. There were no transactions. Business throughout the entire week has been inactive in this market as consumers still buy only according to their immediate requirements. Arrivals thus far this month aggregate 2287 tons, while it is estimated that 2075 tons are afloat.

Copper.—The market is still extremely dull, with little indication on the part of consumers to purchase beyond their actual needs. The Brass trade is dull, and the demand for Copper from the Naugautuck Valley is consequently light. There has been a considerable decline in the price of Brass in all shapes, and as the various manufacturers are no longer bound by agreement the market is becoming demoralized. In the absence of business on 'Change the prices for all grades of Copper remain unchanged. There is talk of a small consuming business having been transacted in carload lots at 11.62½c. to 11.75c. for Lake and 11.50c. to 11.62½c. for Electrolytic and Castings. Prices are still nominal, and the figures which are posted by the New York Metal Exchange are as follows: Lake, 11.65c.; Electrolytic and Casting, 11.45c.; Standard, 10.75c. The London market, after slight fluctuations, closed with a decline on spot and futures higher as follows: Spot, £51 5s.; futures, £51 12s. 6d.; Best Selected, £55 10s. Exports have been very small this month, and now amount to but 7339 tons. The indications at present point to this as being the slimmest month of this year in this respect.

Pig Lead.—Is quiet and unchanged. The official price here is still on a basis of 4.12½c. for spot and 4.10c. for futures. London is unchanged at £10 16s. 3d.

Spelter.—The market is thoroughly demoralized. There is scarcely any demand whatever and prices are declining rapidly. Advices from St. Louis indicate that the metal can be obtained there at 4.45c., and here quotations of 4.70c. to 4.75c. are not productive of business. London is without change at £19 17s. 6d.

Antimony—Is unchanged and easy at 8½c. to 8¾c. for Cookson's, 7⅞c. to 7⅞c. Hallett's and other brands 6¾c. to 7c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—The market is quiet and unchanged, the ruling quotations being $48 per flask of 76½ lbs. each in lots of 50 flasks or more. London is unchanged at £8 15s.

Tin Plate.—There is talk in the trade of interests identified with the Sharon Tin Plate Company, just acquired by the United States Steel Corporation, arranging for the erection of another independent Tin Plate plant. Nothing accurate can be learned as yet however. Quotations are unchanged, being based on present official prices of $3.60 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and $3.79, New York delivery. These prices, it is understood in the trade, will hold until April. The Swansea market is unchanged.

The Frick Coke Company Advance Wages.

(*By Telegraph.*)

PITTSBURGH, PA., December 24, 1902.—In pursuance of their usual policy to always pay the highest rate of wages consistent with the selling price of coke, the H. C. Frick Coke Company of Pittsburgh will post notices on the morning of December 25 at their various coke works in the Connellsville region, announcing an average advance of 8 per cent. in wages on all kinds of coke labor. The advance is entirely unsolicited and will affect the wages of about 18,000 men. The official copy of the notice is as follows:

On and after January 1, 1903, and until further notice the following wages will be paid for labor by this company:

Mining and loading room and rib coal, $1.35 per 100 bushels.

Mining and loading heading coal, $1.50 per 100 bushels.

Mining and loading wet heading coal, $1.55 per 100 bushels.

Drawing coke, per 100 bushels coke, 77 cents.

All of the above measurements as at present.

Drivers and rope riders (shaft and slope), where full runs, $2.50.

Drivers and rope riders (drift), where full runs, $2.40.

Cagers, where full runs, $2.50.

Track layers, blasters and timbermen (shaft and slope), per day, $2.50.

Track layers, blasters and timbermen (drift), per day, $2.40.

All labor not mentioned above regularly employed in operating the plants now receiving $2 and over per day, to be advanced 15 cents per day, and all less than $2 per day 10 cents per day.

Leveling, per oven, 12.75 cents.

Forking box and stock cars and forking open top cars from the yard, all to be advanced 15 cents per day over present price.

Payments semimonthly, on same dates as heretofore.

Other concerns will no doubt give their employees the same advance in wages, as labor in the Connellsville region is on a uniform basis.

Reports that important changes among officials of the H. C. Frick Company are to be made on January 1 are untrue. It is a fact, however, that the Frick Coke Company will abolish their branch offices in all large cities as soon as possible. The company are out of the market entirely as sellers of foundry coke, and in 1903 will supply coke to only 12 or 15 blast furnaces. It is probable that the Frick Coke Company in 1904 will not sell a ton of coke to outside interests. It is the intention of the company to retire from the market as sellers of coke just as soon as the constituent interests of United States Steel Corporation are able to take the entire output. It is said that the H. C. Frick Company made last year over 9,000,000 tons of coke, and their output this year will be considerably larger. Their shipments, however, for the last six months of this year will be less than in the last six months of last year, owing to shortage of cars and motive power. The car and motive power situation is not any better, but is really worse than at any one time since the trouble started.

The Standard Steel Car Company of Pittsburgh, with works at Butler, Pa., have received an order from the New York, New Haven & Hartford Railroad for 2000 steel framed box cars, each with a capacity of 100,000 pounds, and also an order from the Delaware, Lackawanna & Western Railroad for 500 hopper bottom steel coal cars. The Standard Steel Car Company have started to make large additions to their car plant, and when these are completed the main building will be 1800 feet long, and the capacity of the plant will be increased from 60 to 80 cars per day.

The Westinghouse Electric & Mfg. Company of Pittsburgh are making some very heavy shipments of electrical machinery to England at present, principally for the Mersey Tunnel Railway power house, the contract for the conversion of which road is being filled by the English Westinghouse Electric & Mfg. Company.

The new rod mill of the Pittsburgh Steel Company, at Monessen, Pa., is now in successful operation and has already made some creditable records for products of rods. This concern are using a good deal of foreign steel and with very satisfactory results.

Milton Coombs, district manager of the Mahoning and Shenango Valley mills of the American Steel Hoop Company, has been presented by the employees of this plant with a silver tea service. I. W. Jenks, superintendent of the Youngstown mills of the American Steel Hoop Company, has been presented by the employees of the mills with a gold watch and chain.

The New York Machinery Market.

NEW YORK, December 24, 1902.

As an object of universal interest the fast closing balance sheet, of course, occupies the position of chief prominence. Aside from knowing how much greater the profits for 1902 were than those of the phenomenal years preceding it, interest attaches itself principally to the large projects which are scheduled for early 1903. Of these the great Pennsylvania Railroad, North River, Manhattan and East River Tunnel scheme is foremost. The first official hint as to the exact status of the plans for this project was given out yesterday by Fourth Vice-President Samuel Rea of the Pennsylvania Railroad who was in New York for the purpose of consulting the engineers and architects engaged in the preparation of the plans. From the information which could be gathered in the wake of Mr. Rea's flying trip in engineering circles, it is safe to conclude that the plans of Engineer Jacobs, which are being formulated in detail by Westinghouse, Church, Kerr & Co. of this city will be carried out. The method of tunneling will, however, be left to the contractors who will be successful in the bidding. The contract for the tunneling will doubtless be divided into three parts, the divisions being North River, Manhattan Island and East River. The construction of the power stations, of which there will be two, will be provided for in a separate contract. One of the generating stations will be located at the New Jersey end, and the other at the Long Island terminal.

Ever since the project was first announced Westinghouse, Church, Kerr & Co. have been working most energetically on the plans, so that now they are practically completed. The plans were finished in short sections and sent to the engineering department of the Pennsylvania Railroad piecemeal for their approval. The work of getting the specifications in shape for bidders is now well under way and Mr. Rea announced that it is desired to have them in readiness to be dealt out to prospective bidders about January 1. George Gibbs, who, as previously stated in this column, was recently made a vice-president and director of Westinghouse, Church, Kerr & Co., is the mechanical expert of the engineering commission supervising the plans, and he will have direct supervision over the erection and equipment of the power stations and general electrical equipment. The other members of this commission are Col. C. W. Raymond, chief engineer of the United States, in charge of the work in New York harbor; Charles M. Jacobs, who has suggested the plan to be followed in constructing the North River tunnel; Alfred Noble, engineer in charge of the proposed East River tunnel, and Bridge Commissioner Lindenthal of New York, who is also one of the Pennsylvania's consulting engineers. Nothing can be learned as yet as to the proposed capacity of the power stations, although we are advised the plans for the mechanical equipment are practically completed. It is believed in the trade that the general layout of the New York Edison Company's "Waterside" station in New York will be followed out in the proposed stations. It is quite possible, however, that Westinghouse turbines will be employed in connection with Westinghouse generators instead of Westinghouse engines, as is the case in the Waterside equipment.

The Union Railway Company of New York City are about to build a large substation at West Farms, for which they have purchased from the Westinghouse Electric & Mfg. Company a large amount of apparatus, including three 1000-kw. three-phase rotary converters, with starting motors, self cooling, oil insulated transformers and A. C. and D. C. switchboards. The transmission will be at 6300 volts and 3000 alternations. The A. C. switchboard will be equipped with the new Westinghouse type C oil break electrically operated switches. The Bayard Street Station of the Metropolitan Street Railway Company of New York City is also being equipped with these switches.

Bids for the boilers, economizers and appurtenances in connection with the Weehawken grain elevator of the New York Central & Hudson River Railroad were sent to Chief Engineer Wilgus last Monday. It is reported in the street that the contracts for the engines and generators and electrical apparatus were awarded to the Westinghouse companies.

The Northampton Portland Cement Company, whose offices are at 26 Broadway, New York, and whose works are located at Stockertown, Pa., are in the market for a 250 horse-power cross or tandem compound engine, with or without a 175-kw. generator to operate at 250 volts. They are also in the market for several vertical engines between 500 and 1000 horse-power. On the latter quick delivery is the chief essential and second-hand engines will be considered. B. Sherwood-Dunn, the president of the company, is sending out the inquiries.

The Coplay Cement Mfg. Company's proposition for doubling the capacity of their works is now up and will doubtless be disposed of shortly after the first of next year. The New York offices of the company are at 1123 Broadway.

The American Farm Company of Buffalo, N. Y., are in the market for a 250 horse-power water tube boiler and a 200 horse-power engine, with dynamo. The apparatus is for a branch plant to be built at West Seneca, N. Y. John W. Woodruff is president of the company.

We are officially advised of the plans of the Delaware, Lackawanna & Western Railroad for their new Scranton car shops. The plant is to cost about $550,000. The work of grading has just been started. There are to be seven large buildings in the plant, and all are laid out so as to admit enlargement without disturbing the general scheme. The power house is to be 50 x 150 feet, and will be equipped with boilers, engines and generators of a capacity of 2200 horse-power for driving the machinery and lighting the plant. Next to the power house there will be a lumber house, 50 x 175 feet, then the wood working mill, 90 x 400 feet, will be erected. The blacksmith shop will be 80 x 300 feet, with a machine shop, 80 x 180 feet, at right angles, and connected at the end. Just outside the blacksmith shop will be an iron house, 25 x 50 feet, and directly behind is to be erected a coal house the same size. Next to that there will be a store house, 44 x 105 feet, two stories high and a basement with platform around same. The first floor and basement will be occupied by the stores department, and the second story will be used for offices. Directly in front of the storehouse will be the light repair yard, with tracks for holding 102 cars. This repair yard will have a series of material sheds, running directly through the center of it. In front of the mill and machine shop there are to be two freight shops, 150 x 400 feet each, that will hold 48 cars apiece, and a large lavatory between the two buildings. These freight car shops will each be equipped with one 15-ton electric crane. In front of the two shops will be located a freight paint shop, 60 x 400 feet, that will hold 30 cars. The scales are to be located on the tracks leading to the paint shop, so as to weigh cars before they are painted. There is also a storage yard near by that will accommodate 127 cars. This will be used for storing defective cars during the day, so as not to interfere with the working of the plant. The lumber yard is to be located so that the lumber has no backward movement, passing from the yard to the mill, and from the mill to the repair shops, always moving in one direction. The condensed steam from the engines will be used to heat large radiators, located in the various shops, from which hot air will be taken to heat the same by what is known as the hot air fan system. The blacksmith shops will be equipped with what is known as the down draft forge system. The mill will be equipped with a series of exhaust fans, for the purpose of carrying shavings from all machines and depositing the same into the furnaces of the boilers. The repair yards and shops will be thoroughly equipped with narrow gauge tracks for the purpose of transferring materials and refuse on small trucks. Chief Engineer W. K. McFarlin, Hoboken, N. J., has prepared the plans. T. E. Clarke is the division superintendent at Scranton. The machinery from the present car building plant will be transferred to the new plant, and other new and modern machinery will be added.

We have obtained confirmation of the report that the Newton Machine Tool Works, Incorporated, of Philadelphia, are to add extensively to their plant at Twenty-fourth and Vine streets. Bids are now being obtained on an extension 100 x 200 feet and three stories high. The addition will be of the same general construction as the present shop, which, when the extension is completed, will cover the entire square bounded by Twenty-third, Vine, Twenty-fourth and Pearl streets. It is expected to have the extension completed by June 1. In the new shop there will be a 30-ton electric traveling crane and two auxiliary 10-ton cranes. The main crane runways will be extended into the new shop, so that the cranes serving the present plant and the new cranes, nine in all, can be run over the entire shop. When the extension is complete about 400 men will be employed in the plant.

The John Thompson Press Company of Hartford, Conn., have made an extensive purchase of land in Long Island City and will build a new plant on the site. Plans are not completed as yet, but we are advised that the new plant will be thoroughly modern in both general arrangement and equipment.

The Harrisburg Pipe & Pipe Bending Company of Harrisburg, Pa., are in the market for a portable electric drill capable of boring a hole 1¼ inches in diameter. J. H. Patton, president and general manager of the company, is desirous of receiving prices and descriptions of such machines.

The Vulcan Iron Works, Wilkes-Barre, Pa., are obtaining data on two traveling cranes of 30 and 20 tons capacity and two cupolas of 48 inches and 60 inches inside diameter, as well as other foundry and machine shop equipment. They are about to erect a foundry 115 x 300 feet and the present foundry will be fitted up as an erecting shop as soon as the new building is completed. S. T. Nicholson, secretary of the company, is sending out the inquiries.

A new company, known as the Maxon-Miller Jack Company, will erect a foundry and machine shop at Huntington, W. Va., for the production of the Maxon jacks. F. L. Doolittle is the prime mover in the new enterprise and he has

associated with him H. M. Simms, M. E. Brown, J. O. Miller and W. J. Harvey of Huntington.

There is a report in the street to the effect that another effort is to be made to consolidate the 30 manufacturers of emery wheels. The matter, it is said, will be shaped for action at the next meeting of the National Abrasive Association, to be held at Niagara Falls next June.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 20, 1902.

The R. K. Le Blond Machine Tool Company, manufacturers of lathes and milling machines, report 1902 as the best year they have ever had. The increase over the best preceding year has been about 60 per cent. in volume. Their plant has been increased during the year by the erection of an engine and boiler house, also a blacksmith shop, and they have now in course of construction a two-story brick building which is to be occupied for wareroom and shipping purposes, 80 x 100 feet. It will be ready for occupancy some time within the next 30 days. The feature of their trade has been in accord with the general experience in machine tool lines, that the demand is constantly toward machines of greater weight and capacity, and to satisfy this demand they are developing their tools along heavier lines.

The Lodge & Shipley Machine Tool Company, in addition to the extensive improvements which have already been reported in *The Iron Age*, and which are now just undergoing the finishing touches, have built a railway throughout their works and grounds connecting all parts and the different buildings in its route, thus adding materially to convenience in handling their product. They are also going a step beyond the utilitarian, and are beautifying their grounds with flower beds and sod in a way that is not usually looked for in the business districts. This feature, however, is not a new one with them, for in the past they have maintained flower beds and a fine lawn in front of their premises, but the work now in hand is simply an extension of that which already has been.

Smith & Mills are builders of shapers exclusively and confine themselves to the smaller sizes. They report the year just closed as the largest in volume of business which they have ever enjoyed. During the year they have built and sold over 500 of their machines, which range in size from 12 to 15 inches.

Schumacher & Boye have just completed the erection of an additional building and have equipped it with over $40,000 worth of new machinery. The total investment represented in this extension amounts to over $60,000, which, with the plant as it already was, makes them one of the largest lathe making concerns in this section of the country. They have recently patented some excellent devices for attachment to their lathes for changing feed and for screw cutting, which they expect will meet with favorable recognition from the trade at large.

The Rahn-Mayer-Carpenter Company have made somewhat of an increase in their equipment during the year, and, in addition to the new engine and machine tools installed, they have equipped their shop with traveling cranes, with the view of increasing their capacity in the direction of the manufacture of heavier tools.

The Cincinnati Punch & Shear Company report an exceptionally good year, with specially good trade with the railroads, shipyards and structural iron works. They have found business most excellent and orders, if anything, rather ahead of their capacity to produce promptly. The outlook for the coming year is excellent. At present they have under construction very heavy tools for the International Harvester Company of Springfield, Ohio, the League Island Navy Yard, the North Carolina Bridge & Steel Company and one special double punch of extra heavy pattern for railroad work to go to Carlisle, Pa. They have also under construction a machine which requires special mention for the fact that it is to be used by the Herreshoff Mfg. Company in the building of the new cup defender.

John Steptoe & Co., who have just completed the erection of new shops on Colerain avenue, are already contemplating additions in the shape of wings to the new plant, which when equipped will more than double their capacity. They, like others in their line, are making improvements with the view of entering into the manufacture of heavier tools. They are manufacturers of shapers exclusively.

The Dreses Machine Tool Company are among the few concerns who report an increase in foreign trade. During the year they have marketed quite a good percentage of their output in England, Scandinavia and Holland. They have added quite a number of new features to their radial drills and have increased their capacity very materially by the installment of new machinery. They are, like most other tool builders, well up in the ranks of optimists and think that 1903 will make a new record for production in their line.

The Hoefinghoff & Laue Foundry Company are to change their style after January 1. They will be known as the Bollman & Wilson Foundry Company. The officers will remain the same as at present. With the exception of the coke troubles, in which they have shared like all others, the year just past has been a fine one from a business point of view. Their output for the year in castings amounted to over 10,000 tons, and this amount would have been very materially increased except for the fact of the inability during the later months to secure all the materials which they required. Not long ago, in their Norwood foundry, they turned out one casting from a single cupola which weighed 75,000 pounds. The casting was for the Bullock Electric Company. They are working on the contract for the new Cincinnati Water Works and have made over 40 castings, each weighing above 40,000 pounds. They have increased the number of employees from 235 to 480, and are expecting to increase the capacity of the Norwood foundry some time during the coming year. They intend to engage in the manufacture of semi-steel castings, in which, if they prove successful, they intend to establish a separate branch.

The I. & E. Greenwald Company report an unusually good year in the building of heavy engines and in the manufacture of coal washing machinery. The trade in gears, of which the company make a specialty, is also almost phenomenal, and in order to increase their capacity they have during the last few months made a general rearrangement of their shop and have added a Linn water tube boiler of 200 horsepower. They are also on the eve of the construction of a 55 x 180 foot addition to their plant.

The Cincinnati Screw & Tap Company are just completing the installment of new machines at a cost of $10,000, which will increase their capacity about 20 per cent. Their trade lies principally within the limits of the States immediately bordering upon Ohio, and their product enters very largely into the necessaries of engine builders, machine tool makers and agricultural implement plants. The last mentioned have been rather dull during the year, but in their other lines they are meeting with fine demand and the outlook for the coming year is especially interesting.

The Blymyer Iron Works Company's business lies very largely outside of the limits of the United States proper. They are makers of coffee, rice and sugar plantation machinery, and have developed a very satisfactory business with countries to which this class of machines go. At present they are having a very good trade with Mexico and Central America, which is caused by the development of that section by American capital. Within the past ten years a good number of American companies have opened plantations and these are now coming into bearing, and as a result are turning to the United States for machinery for the handling of their products. This is becoming one of the strong factors in making such concerns as the Blymyer Company busy. They are also having quite a good trade with Africa, notably that portion which has been colonized by the Portuguese. During the year the company have made an important addition to their machine shop and have been, and are now, running overtime, as the necessity of their growing trade has demanded.

The John H. McGowan Company, builders of pumping machinery, are more than usually busy. Among their recent shipments was one of a complete set of pumps, which was shipped via steamer from New Orleans on December 1 for a point in Mexico, for the equipment of a large sugar refinery which is being erected there. This shipment amounted to four carloads and included vacuum pumps, sweet water and supply pumps. They have recently taken a contract for what will be the largest pump in any private plant in the Southern States. It is a large compound pump for use in the new St. Charles Hotel at New Orleans. They have also increased their capacity during the year by the addition of quite a number of new machine tools and have under contemplation further extensive additions to their shops within the next few months.

The J. M. Robinson Company have increased their shop capacity 25 per cent. during the past year by additional equipment in the way of new and heavier machine tools. They have found foreign trade as fair during the year as it usually has been, and have shipped some good sized lots of corrugating and bending machinery to England and Canada. The problem in their business is for the production of heavier machines, as the changing conditions in architectural and other lines of business to which they cater necessitate the handling of much heavier material than formerly. They regard the outlook for the year as excellent.

The F. M. Watkins Mfg. Company, manufacturers of gasoline engines from 2 to 25 horse-power, report trade excellent and the outlook for the coming year very bright, and in order to meet the increased demand of trade they have increased the capacity of their plant by additions to their buildings and equipment until they have reached a point 50 per cent. above their capacity of a year ago.

The Triumph Electric Company have rearranged their shops and increased their capacity in various ways until they have been able to handle nearly 50 per cent. more business in 1902 than they did in previous years. Inquiry just now is excellent and the outlook for the new year is good.

Scotch Iron and Coal Trades.

Speculation and Trade in Pig Iron.

GLASGOW, December 11, 1902.—The speculative movement in the iron warrant market reached a crisis last week, when after being compelled to pay a backwardation of 4 shillings per ton to carry them forward for a month, the "bears" seemed to have all the grit taken out of them. After they had been thoroughly squeezed the price of Cleveland warrants (in which practically all the speculation was) was dropped 2 shillings per ton, and the difference between cash and month prompts fell to 4 pence per ton. But after a pause the bears were incited to short selling again by discouraging advices cabled from your side Moreover they turned their attention also to Scotch and Cumberland warrants, so that while prices dropped further the difference between cash and month rose again to a shilling a ton. Thus the market is again getting oversold and the bull holders of warrants will in due time make another good haul, unless there is a big collapse. At the time of writing Scotch warrants are 54 shillings 9 pence, Cleveland 47 shillings 9 pence and Cumberland 58 shillings 9 pence. There are 25,500 tons in the Glasgow warrant stores, 122,000 tons in the Cleveland stores and 23,500 tons in the West Coast stores. In Cleveland there are about the same number of furnaces in blast as last year, and in Scotland there are four more in blast, so the output is full. Makers' prices have not been reduced proportionately with warrants, because makers are kept well employed in completing home and shipping orders, with more to spare to convert into warrants and also because here in Scotland they are having to pay more by 6 pence per ton for splint coal for the furnaces. The home consumption in Scotland is fairly good, considering the doubtful outlook of trade generally. The steel makers are still using a good deal, and pipe founders are rather increasing their consumption, for some large contracts for pipes have lately been placed here. Hematite iron it may be noted has not receded so much as ordinary iron, but then it never advanced so much and is at a level at which there can be little profit in smelting.

The bear operations in warrants have been actuated by the belief that the American demand was over and that a run down was about to begin on your side. But there are fully 50,000 tons of pig iron on past orders for shipment to the United States this month, more orders have come in within the last few days, although not to anything like the former extent, and inquiries are still frequent. During November our shipments to the United States aggregated 79,564 tons, as compared with 4507 tons in November, 1902. Our entire exports during the month were 130,330 tons, as against 68,115 tons in the corresponding month last year. It will be observed that the net increase is less than the increase in the shipments to the United States. Canada last month took 3500 tons, as against 1489 tons, and we ascribe that increase to the nonability of your smelters to supply her. In the 11 months ending November we have shipped to the United States 415,711 tons, as against 40,886 tons last year, and to Canada 41,574 tons, as against 9058 tons. The increase is 407,281 tons due to the shortage on your side. On the other hand we have shipped 165,662 tons less to Germany, Holland and Belgium. Our total shipments have been 980,186 tons, as against 789,255 tons. This is a net increase of only 190,931 tons, although the increase in the shipments to America and Canada is 407,281 tons. These figures support the contention that when the American demand falls off there will be a severe drop in our shipments reacting upon the general market. As to whether and when your demand is going to stop we are, of course, in the dark. But I may add that even to-day a new order has been received for a cargo of Cleveland iron, to be shipped to one of your ports in January.

The General Iron and Steel Situation.

Depressing as is the outlook in the shipbuilding industry for next year, the shipyards here are still pretty well employed and steel makers and iron founders have a good deal to do. As prices are lower and costs are high profits are not brilliant, but a very small profit is a great deal better than idleness. A feature of the time is the liberal demand for cast iron pipes, the making of which is an extensive Glasgow industry. One contract alone placed within the last week of so is for 20,000 tons, large sizes, for India. Some large locomotive contracts have also recently been placed with our builders. Of course these are only branches of general industry, and it is not to be denied that makers of what we call malleable iron are far from busy. Indeed in one concern the men have all received notice terminating their agreements in order that the work may be shut down, so unprofitable has it become, but this, it should be noted, is an old and not modernly equipped factory. I do not say that any portion of our iron and steel manufacturing industry is in a high state of prosperous activity, but we are better off here than they are in the North of England just now.

Scotch steel makers have been very well supplied with American orders for some time, though they have not said much about it. Apropos of this I may mention that the exports from the United Kingdom to the United States during that month have been of railway iron and steel 17,406 tons, as against 42 tons last year; iron and steel wire 3432 tons, as against 3005 tons; miscellaneous iron and steel items, 2317 tons, as against 1926 tons; old iron for remanufacture 15,174 tons, as against 792 tons; unwrought steel 46,049 tons, as against 12,222 tons. It is in the last named item that the Scotch shipments chiefly figure.

The Coal Trade.

Coal is still being shipped to your ports, not so much from Scotland as from England and Wales. So recently as this week steamers have been chartered to load on the Tyne for New York at 6 shillings, at Cardiff for New York at 6 shillings and for Boston at 6 shillings 3 pence and at Swansea for New York at 6 shillings. Whether these shipments be in execution of new orders or are in completion of "boom" contracts one cannot say, but the coal is going and more orders are coming in. During November the shipments from the United Kingdom were 222,137 tons to your Atlantic ports and 3382 tons to your Pacific ports, as compared with 1205 tons and 9811 tons respectively in November last year. During the 11 months our shipments of coal have been 584,815 tons to your Atlantic ports and 134,468 tons to your Pacific ports, as compared with 12,257 tons and 115,273 tons respectively last year. These are notable differences, and the diversion of tonnage has had a curious effect on the freight market by throwing a large number of "seeking" vessels on to your side of the Atlantic.

On looking at the export returns of the Board of Trade I observe that total exports of coal in the 11 months have been 41,151,817 tons, as compared with 40,334,579 tons last year. This is an increase of 817,238 tons. But the shipments from the Scotch ports alone were upward of 1,000,000 tons more than last year. It would appear, then, that but for the activity in Scotland the total would have been about 200,000 tons less than in 1901. And certainly it is remarkable how well the shipments at the Scotch coal ports have kept up till now in spite of apparently adverse conditions. There will be little more done this year beyond completing contracts, and there is not a great deal of contracting being done for the next year, but the home consumption is active. The wage question with the miners is settled here by the award of the arbiter halving their claims, but in the Midlands of England and in Wales the old labor trouble is still hanging over the market.

Jones & Laughlin Steel Company.—The Jones & Laughlin Steel Company of Pittsburgh have opened branch offices in the Arcade Building, Philadelphia, in charge of T. M. Campbell, district sales manager. Mr. Campbell has formerly represented the interests of the Jones & Laughlin Steel Company in the Pittsburgh district. The new Philadelphia offices will cover all the business of the Philadelphia district, including Baltimore, Washington, D. C., Norfolk and Richmond, Va. Mr. Campbell will have a corps of assistants, and it is the intention to maintain the very highest standard of efficiency in the new Philadelphia offices of this concern.

Mr. Campbell's friends will wish him ample success in this higher and larger field, his appointment as manager of the Philadelphia office being a fitting recognition of his strict integrity and high ability.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, December 24, 1902.

Pig Iron.—There has been some inquiry for Pig Iron in the past week, and we note sales of about 20,000 tons of Bessemer for the first six months at $20.50 to $21 at furnace. A deal is said to be under way by which the United States Steel Corporation will secure additional blast furnace property, and if this is put through it may mean the permanent retirement of the Steel Corporation from the market as a buyer of Pig Iron. Blast furnaces are still hampered in their operations for lack of Coke and the situation does not promise any permanent relief for some months to come. Gray Forge is somewhat quiet and is held at $20.25 to $20.50, Pittsburgh. No. 2 Foundry Iron is somewhat lower in price and is about $22.50, Pittsburgh, for delivery in first three months.

Steel.—While the Steel market is somewhat quiet as regards sales prices are very firm. A good many German Billets are coming into the Pittsburgh market via Baltimore, at about $28 delivered. We quote domestic Bessemer Billets at $29 to $29.50 and Open Hearth $30 to $31, Pittsburgh.

(By Mail.)

Reliable reports are current that shortly after the first of the year the United States Steel Corporation will increase its holdings of blast furnaces and Steel works in the Pittsburgh district by taking over one or two other concerns. Nothing definite in regard to this has been given out, but official announcement may be made at any time. The Iron trade continues somewhat quiet, as it always is in the closing month of the year, but the market is firm, with every indication of a splendid business next year. The renewal of the Beam and Plate agreements indicates that the same conservative policy will be pursued in the future as has marked the operation of these agreements in the past. Shipments of Iron and Steel have been heavy this month in order to take advantage of the present freight rates, which will be advanced January 1. Shipments of Coke still continue very unsatisfactory and a number of blast furnaces in both Valleys continue banked.

Plates.—The Plate Association met last week and renewed their agreement for 1903. The operations of the association in the past year have been very satisfactory and percentages were renewed on practically the same basis as before. Some of the Eastern mills were insistent that an advance in prices should be made, but this was voted down. We note a continued heavy demand for Plates, the mills steadily booking large orders and a good deal of tonnage is in sight. Prompt Plates continue to bring from 1.75c. to 2c. at mill, depending on the tonnage and deliveries wanted. For indefinite deliveries association prices are as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Rods.—There is practically no buying and prices are only fairly strong. We quote Bessemer Rods at $34.50, Pittsburgh, and on a firm offer this might be shaded. Open Hearth Rods are held at $35 to $35.50, Pittsburgh.

Structural Material.—Very heavy contracts for bridge work continue to be placed, the leading interest having booked close to 35,000 tons this month. A good deal of work is coming up both East and West and the outlook is that the structural mills will have more business in 1903 than they can readily handle. Reasonably prompt deliveries are now being made in Beams and Channels and premiums on these are disappearing. However, prompt Beams and Channels bring from 2c. to 2.25c., at mill. The Beam agreement was renewed last week for 1903, W. C. Temple of this city continuing as commissioner. For extended delivery we quote: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Muck Bar.—The market is very dull, practically no business being placed and prices are weak. We quote local makes of Muck Bar at $32.50 to $33, Pittsburgh.

Bars.—The situation is only fairly satisfactory, mills rolling both Iron and Steel Bars apparently being more anxious for orders than for some time. It is hoped tonnage will improve after the first of the year. The continuous Bar mills of Jones & Laughlin Steel Company and Carnegie Steel Company, when pushed hard, can each turn out from 800 to 1000 tons of Bars per day, and it takes a good deal more business than formerly to keep the mills filled up. Specifications on old contracts are coming in at a fairly satisfactory rate. We quote Iron Bars at 1.70c. to 1.80c. in carloads and 1.85c. in small lots, half extras, as per National card. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10 per lb. extra. Quantities less than 1000 lbs., 0.30 per lb. extra, the total weight of a size to determine the extra regardless of length.

Hoops and Bands.—A moderate amount of tonnage is being placed, and we quote Hoops from Bessemer stock at 1.90c. in 250-ton lots and over, and 2c. in carload lots, at mill. Bands are 1.60c. up to No. 12 gauge, with extras as per Steel Bar card. For Open Hearth stock, $2 a ton additional is charged.

Sheets.—The general situation in the Sheet trade is unsatisfactory, tonnage not being large enough by any means to give the mills full work. Prices on Black Sheets are fairly firm, but on Galvanized a good deal of cutting is being done. An improved demand for Sheets is looked for after the first of the year. We quote Nos. 22 and 24 Black Sheets, box annealed, one pass through cold rolls, at 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. These prices are for carloads and larger lots, buyers charging the usual advances on small lots from store. On Galvanized Sheets we quote Nos. 26, 27 and 28 at 75, 10 and 2½ to 75, 10 and 5 per cent. off for carloads and larger lots. In net prices these are equal to about 3.25c. for No. 26, 3.42c. for No. 27, and 3.70c. for No. 28. These prices apply only on carloads and larger lots and are f.o.b. at mill. On less than carloads jobbers charge the usual advances.

Merchant Steel.—A meeting of the Shafting Association is to be held in this city next week, but it is not anticipated that any change in prices will be made. We note a fair demand for the various kinds of Merchant Steel and the mills have a good deal of tonnage booked ahead. Prices are only fairly firm, good orders usually being taken at a concession. We quote for carloads, f.o.b. mill, as follows: Tire, 2.15c. to 2.25c.; Spring, 2.25c. to 2.35c.; Toe Calk, 2.30c. to 2.40c., base; Sleigh Shoe, 2.15c. to 2.25c. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads, delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is 6½c. to 10c. for ordinary grades and 12c. and upward for special grades.

Boston Machinery Market.

BOSTON, MASS., December 20, 1902.

According to the reports of Boston machinery and machine tool dealers they should be in a frame of mind conducive to the enjoyment of the Christmas holidays. All the dealers seen this week told the same story. Business continues good and there is more in sight. One or two houses were anticipating their usual end of the year dullness, but there was no anxiety on that score. On the contrary, there were expectations that the quietness would only last until inventories were taken and the new year fairly under way. As has been the case during the past few months, there has been no special demand in particular lines, but for all kinds of machinery—that is, so far as the domestic market is concerned. One firm reported a sudden increase in foreign orders, especially for lathes, and called attention to the crowded condition of their salesroom, where the machinery was being got in readiness for shipment abroad. Another firm are shipping a large order to Seattle, Wash.

Henry F. Hill, dealer in and appraiser of machinery, is giving out a very neat celluloid pocket calendar for 1903.

Franklin M. Nichols, for many years in the piano hardware business in Boston, recently died and his body was placed in the family tomb in the burying ground on Boston Common.

The Boston & Northern Street Railroad Company are preparing to build a large power station at Gloucester, Mass., and the Old Colony Street Railway Company are to erect a similar building in Taunton, Mass.

A dispatch from Athol, Mass., states that Dresser T. Bates, Stephen E. French and Frank S. Ewing of Orange, Mass., have bought the controlling interest in the Athol Machine Company, which was owned by Stephen H. Bellows and John P. B. Wells. The new owners propose to continue the business in Athol.

The Walworth Mfg. Company have obtained a permit to build a brick foundry and cupola house on East First street, near O street, South Boston. The foundry will be of one story, 22 feet high and measuring 90 x 300 feet, and the cupola house will be of two stories, 27 feet high and measuring 20 x 40 feet.

Bay State Lodge, No. 9, of the International Boiler Makers' and Iron Shipbuilders' Union has notified Boston

manufacturers of boilers and iron vessels that it desires a revival of the apprentice system. The union's constitution provides that one apprentice shall be allowed to every five mechanics and one apprentice to every five boiler makers and shipbuilders.

President Pritchett of the Massachusetts Institute of Technology takes issue with the members of the American Society of Mechanical Engineers who oppose the adoption of the metric system in this country. He says: "Mr. Halsey's statements as to the survival of old standards in various countries have significance, not in showing the fitness or unfitness of the metric system, but as showing the strength of conservatism, even among an intelligent people. . . . Mr. Halsey quotes the testimony of an American superintendent of motive power to prove that the English standards of weight and length are used in Mexico. But the Mexican railroads are practically American roads and their equipment is received from the United States. That they should use our standards is as natural, even as necessary, as it would be to use those measures for railroad equipment in the United States. If Mr. Halsey will go outside the mechanical department of these American roads he will find it impossible to do business, except in the metric system." In reply to Mr. Halsey's statement that nearly all St. Louis real estate is now measured in arpents, because the early French settlers used that unit of measurement, President Pritchett says: "Not only is no piece of real estate in St. Louis measured in arpents, but I question whether among the 600,000 inhabitants of St. Louis a score could be found who even know what is an arpent. As an actual unit of length it has absolutely disappeared. . . . The argument for the preservation of old and inconvenient standards rests on no other basis than inertia of the general mass of mankind. I beg to ask the attention of engineers to the real questions, which, briefly stated, seem to me to be these: 1. Is a common system of weights and measures for the whole civilized world a desirable thing? 2. Are the benefits to be gained by a universal system of weights and measures sufficient to justify a country in surrendering its present system to adopt such a world system? 3. Is the metric system one fitted to the needs of the civilized world and has it already gained such general adoption as to make it available as a world system? Action by the United States in adopting the metric system would soon lead to similar action by England and Russia, thus bringing about a world system."

Owing to the assignment of F. G. Coburn & Co., the Boston contractors who were to build the forge shops and the chain and anchor storage shed for the equipment department at the Charlestown Navy Yard, the United States Government has decided to have the Navy Department finish the forge shop, as it is needed immediately. If the shop is finished for less than the contract price the difference will be paid to Coburn & Co.'s assignee. The Government officials have not decided who shall finish the chain and anchor storage shed, but it is probable that the Navy Department will take that job also. The firm's liabilities were estimated at $150,000 and their assets at $62,000. The assignment was due to the failure of the Central National Bank. The two buildings at the navy yard are to cost about $220,000. The firm had finished about 70 per cent. of the work on the forge shop and about 80 per cent. of the work on the chain and anchor storage shed.

Cleveland Machinery Market.

CLEVELAND, OHIO, December 22, 1902.

Cleveland's machinery dealers and manufacturers are winding up the most prosperous year in their history with one of the best months ever experienced. A round of a number of the leading establishments discloses the fact that comparatively few concerns are experiencing the tapering off in orders which almost invariably comes at this time of the year. In a number of cases there is a falling off in shipments, but orders for future delivery are coming in with uninterrupted regularity. There is evidently a general feeling that the prosperity which has been with us for several years past is assured for another year at least. If the development which has taken place in Cleveland during the past year is a criterion for the balance of the country, it is difficult to see how the expansion can go on at this rate for more than two or three years. Concern after concern claims that its business for the year is double that of last year, while an increase of 25 per cent. over 1901 is a common statement, this, too, in the face of the fact that material and labor have been unusually hard to secure, making it difficult to run nights or on double shifts, as has been the common practice during rush times. The following is a list of Cleveland concerns manufacturing iron and steel products, and all of them using machine tools that have erected entirely new plants during the past year:

Brown Hoisting Machinery Company, Wellman-Seaver-Morgan Engineering Company, Lake Shore & Michigan Southern repair shops, National Acme Mfg. Company, Interstate Foundry Company, Johnson & Jennings Company, Kuhlman Car Company, Winton Motor Carriage Company, Snyder-Hughes Company, Electric Controller & Supply Company, Cleveland Crane & Car Company, Bassett-Presley Company, Cleveland Car Company, Cleveland Pneumatic Tool Company, Cleveland Machine & Mfg. Company, Baker Motor Vehicle Company, Lucas Machine Tool Company, Browning Engineering Company, Foot, Burt & Co., Reade Machinery Company, Resek Machinery & Tool Company, Frost Wire Fence Company and Osborn Mfg. Company.

Added to the above, the following have made important additions during the year: Ajax Mfg. Company, Acme Machinery Company, Cleveland Twist Drill Company, Chisholm & Moore Mfg. Company, Garry Iron & Steel Company, Kilby Mfg. Company, King Bridge Company, Cleveland Punch & Shear Works, White Sewing Machine Company, Cleveland Hardware Company, Bronson-Walton Company, Hill Clutch Company, National Iron & Wire Company, Standard Tool Company, McBeth Iron Company, Bishop & Babcock, W. S. Tyler Company, Vulcanus Forging Company, Parish & Bingham Company, Variety Iron Works, Cleveland Wire Spring Company, Oster Mfg. Company, C. O. Bartlett & Snow Company, Cleveland Frog & Crossing Company, American Steel & Wire Company, Acme Foundry Company, Cleveland Tool & Stampings Company, Kirk-Latty Mfg. Company and Dangler Stove & Mfg. Company.

George H. Bowler & Co., Williamson Building, who heretofore have confined themselves almost wholly to the sale of second-hand machinery, are preparing to open an establishment at 20-24 Factory street, where they will handle new machinery of all kinds. They are in correspondence with a number of manufacturers relative to handling various lines of machinery, and will announce their complete line about the first of the year. They have been very successful in the sale of second-hand goods, and will undoubtedly become an important factor in the sale of new tools. They are about to close a deal whereby they will secure the complete stock of a well-known Cincinnati machinery dealer. They state that the past month has been the most successful in their history, and in addition to selling a large amount of second-hand machinery they have disposed of a number of large second-hand engines and boilers, which they state are in unusual demand.

The Resek Machinery & Tool Company are erecting a new factory on Quincy street, where they will manufacture machinery of various kinds.

The Eclipse Machine Company are fitting up a good sized machine shop in the Ajax Building, where they will do experimental work. It is understood they will buy considerable new machinery.

The McBeth Iron Company, founders and machinists, have completed a large addition to their factory.

The S. M. York Company do not share in the experience that business has dropped off prior to the first of the year. They state that December has been about the best month this season, although a number of their orders have been for delivery after the first of the year. Their business this year has been $100,000 better than last year, despite the fact they have dropped the sale of supplies and are confining themselves exclusively to machine tools. They report a strong demand for tools from automobile manufacturers, and have recently sold a considerable equipment to the Hoffman Automobile & Mfg. Company, this city.

The Marshall & Huschart Machinery Company report that shipments this month have been comparatively small. Owing to the disastrous fire at their Chicago warehouse, the Cleveland stock has been drawn from to an unusual degree, and the stock has become depleted on a number of lines. Their total business for the year from this territory will show up fully 25 per cent. better than last year. One of their best orders of late was for the complete equipment of the shop of the new Elyria Iron & Steel Company, Elyria.

Manning, Maxwell & Moore's local office state that their year's business will run far ahead of last year. Several good deals have been closed up this month, among them a contract for the shop equipment of the Sandusky Foundry & Machine Company, Sandusky. David Hunt, Jr., who has met with great success in the management of the Cleveland office of this company, has resigned, effective January 1, to accept the position of general manager of the Baush Machine Tool Company, Springfield, Ohio.

The Cleveland Pneumatic Tool Company are preparing to move into their new factory at the corner of Second and Central avenues. They have not yet purchased very much new machinery, but expect to add to their equipment after they are fully settled in the new shop.

Bardons & Oliver, manufacturers of turret lathes and screw machines, whose factory burned down two weeks ago, have not decided on their future movements, although it is very probable that a new factory will be erected in Cleveland. At present they are occupying two floors of the Balkwill Building, 1301 St. Clair street, where they have installed much new machinery and are employing a considerable force in taking care of pressing orders. Fortunately their stock room was not injured and they have quite a stock of certain styles of machines on hand.

The Snyder-Hughes Company, pumping machinery manufacturers, are moving into their new plant at the corner of the Pennsylvania tracks and Sheridan street. There are three buildings: a machine shop, 80 x 200 feet; pattern shop, 50 x 100 feet, and office, 45 x 45 feet. The site includes 4 acres, and next spring they propose to erect a large foundry. They have not yet purchased new equipment to fill up the additional space, but will do so later.

The Cleveland Armature Works will move into a portion of the shop vacated by the Snyder-Hughes Company. They do an extensive electrical repair business and will increase their facilities by purchasing a number of winding lathes.

The Cleveland Punch & Shear Works have recently closed an important contract for a number of large tools for the Great Lakes Engineering Works, who are building a large plant at Detroit. Among recent contracts for large tools secured by the above concern were the following: Carolina Bridge & Steel Company, Burlington, N. C., one 36-inch throat punch, two 19-inch throat punches and one 18-inch throat punch; Joseph T. Ryerson & Son, Chicago, one 8-foot bending roll; Hinkle Iron Company, New York City, one large double punch and shear; Johnson & Jennings Company, Cleveland, one 36-inch rotary planer; McDowell, Stocker & Co., Chicago, one 12-inch double throat punch, one 12-inch single punch and one 15-inch throat punch; Vulcanus Forging Company, one 10-spindle drill; Elwell-Parker Electric Company, Cleveland, one 10½-inch throat punch; E. A. Kinsey Company, Cincinnati, one No. 3 bar shear, and the Titusville Iron Company, Titusville, Pa., one 14-inch throat punch. They recently shipped a multiple punch weighing 100,000 pounds to the Atlas Engine Works, Indianapolis.

The Acme Machinery Company have just moved into their new offices and erecting shop. The office building is a fine two-story structure, designed so that additional floors can be erected for factory use. The offices are as complete and handsome as those of any manufacturing concern in the city. The erecting shop is built largely of steel and glass, making an exceedingly light and airy room. It is 80 x 180 feet and is covered by a 20-ton 50-foot span crane furnished by the Brown Hoisting Machinery Company, this city. They are installing several large tools, among them an 8-foot Pond planer designed for heavy work. Nearly all their new tools are electrically driven, as they have recently built an electrically equipped power station. During the past year they have put over $100,000 into factory improvements and now have one of the finest manufacturing plants in the city. They increased their capacity over 25 per cent. and their business has increased correspondingly. They are bringing out a new automatic nut tapping machine which is meeting with very large demand.

The Kilby Mfg. Company have closed another contract for a complete sugar plant and now have about all the business they can handle for the coming season. The outfit is for the Windsor Sugar Company, Windsor, Col., and will have a capacity of 600 tons per day. Following their usual practice, they will furnish engine, boiler and complete machine shop, in addition to the sugar machinery.

E. H. Dyer & Co., New England Building, have closed two important sugar contracts, one for a 1200-ton house for the Brush Sugar Company, Brusk, Col., and another of the same capacity for the Ft. Morgan Sugar Company, Ft. Morgan, Col. They also furnish the entire equipment.

The Garry Iron & Steel Company have secured contracts from the Kilby Mfg. Company for all the structural work and roofing required for sugar plants at Ft. Collins, Col., Owosso, Mich., and Windsor, Col. The buildings include boiler house, lime house, warehouse and machine shop for each plant. They are furnishing structural work for additions to the plants of the Elyria Iron & Steel Company, Elyria, Ohio, and the Lucas Machine Tool Company, Glennville. These will double the capacity of both plants, which were erected recently. In their crane department the Garry Company are furnishing cranes for the Westinghouse Electric & Mfg. Company's Cleveland plant, Big Four Railway shops, Chicago & Southeastern Railway and Chicago, Burlington & Quincy Railway.

The Variety Iron Works have on hand the largest amount of work ever handled. They are considerably behind on orders, and their business this year has been 25 per cent. larger than in 1901. They are furnishing almost the entire equipment for the new furnaces of the Cleveland Furnace Company, Cleveland, and the Toledo Furnace Company, Toledo; are making extensive repairs to the furnaces for the Penn Iron & Coal Company; are building additions for the Lorain Foundry Company, Lorain, Ohio, and Wickwire Brothers, Courtland, N. Y., and have just received an order for a steel stack at Washington, which will be the largest in that city. During the past year they have removed a greater portion of their plant from the old site on the "flats" to new shops on Hamilton street, and are preparing to break ground for a boiler shop, 120 x 160 feet, into which structure the equipment of the old shop will be removed. They will also install new electrically driven machinery.

The C. O. Bartlett & Snow Company are having inquiries from every section of the country for their system of preparing and burning powdered coal, which was described in a recent issue of *The Iron Age*. They are planning to organize a separate company to manufacture this class of equipment. They are furnishing a dryer outfit of 100 tons capacity to the Illinois Central Railway, who are understood to be experimenting with powdered coal for fuel, and among other important contracts are building an elevating and conveying outfit for the Cleveland Gas & Coke Company. They state their business this year has been fully twice as large as any previous year, and there is every prospect of continued prosperity for a year or two at the least.

A Cleveland stockholder of the Structural Steel Car Company of Canton, Ohio, states that the officials of the company have finally arrived at an agreement with Eastern capitalists whereby the capital stock of the company will be increased and the plant placed in position to commence immediate operations. It is also the intention to enlarge the plant to take care of all classes of work in their line.

The Bedford Steel Company, who have been organized by the members of the firm of Kaltenbach & Griess, have purchased 400 acres of land at Bedford, 12 miles from Cleveland, and will commence breaking ground February 1, for the plant, which, to start with, will comprise four large buildings, giving employment to 700 men. The company have a capital stock of $300,000, and they will produce structural material. In addition to Kaltenbach & Griess, the others interested are C. A. Klumpf, Paul Schneider, Martin Mullen of Cleveland and several Cincinnati people.

The Crandall Fence & Iron Company, Sandusky, have passed into the hands of John D. Mack and A. C. Blinn. The former was connected with the Ohio Motor Company, Sandusky, but has withdrawn from that company and will assume the general management of the Crandall Company. They manufacture fence, fire escapes, iron doors, steel stairs and similar products, and it is the intention to enlarge the lant.

The Toledo Steam Trap Company have been organized at Toledo with $50,000 capital stock, to manufacture the Moore automatic steam trap and the Fisher rotary pump; the latter was formerly manufactured in Denver, Colo. The company have completed plans for a factory to be located on the Terminal Belt Railway, near Woodville, on a site purchased for the purpose.

The Buckeye Aluminum Company have been organized with $50,000 capital stock, at Doylestown. Interested parties are: W. R. Miller, W. A. Huffman, D. V. Huffman, L. K. Franks and G. E. Gardner, all of Doylestown. The company have bought out the business of the Bay State Aluminum Company, and the plant now located at Quincy, Mass. will be removed to Doylestown. A new factory will be erected.

The Findlay Axe & Tool Company, Findlay, have purchased the old plant of the Salem Wire Nail Company in that city and they will remove at once. They will purchase new machinery to more than double their former capacity.

The Yost Electric Mfg. Company of Toledo have organized with $75,000 capital stock, and have bought up the plant and business of the Yost-Miller Company. They will manufacture sockets for electric lamps and lawn sprinklers. Among those interested are J. L. Yost, J. M. Bour, E. C. Coffin, John Stolberg, J. M. Bour, George F. Miller and John Renner.

The Camp Rubber Company, Akron, will build two additions to their plant at Ashland, 70 x 100 feet, and 40 x 150 feet, both four stories. Additional power equipment will be installed.

The Marietta Mfg. Company, Marietta, have the contracts for furnishing the machinery for seven Ohio River steamboats to be built for various people this winter. They will install electric lighting plants for illumination and searchlights, as well as engines, boilers and chains.

The Warren Steam Pump Company, Warren, Mass., will this week vote upon a proposition to increase the capital stock from $100,000 to $200,000, the increased capital to be used for extending the business and for any future enlargements of the plant that the directors may deem advisable. The company have about completed a new machine shop and engine room, containing 14,000 square feet of floor space, which will give them an entire floor space of 30,000 square feet. The buildings will be equipped with the latest improved machinery, all of which has been ordered, including an electric traveling crane of 20 tons capacity, which will run the entire length of the shop in one minute, and a Slater engine of 150 horse-power. A switch running directly into the shop from the Boston & Albany Railroad will furnish excellent shipping facilities. The entire plant will be in operation early in January. W. H. Fairbanks is president.

HARDWARE.

WHEN a prominent jobbing house issue an imposing catalogue illustrating a line of Saddlery Hardware and Harness it is an event that deserves attention from the trade at large, even if they do not examine it as prospective customers. It is in the first place a striking example of the expansion of the term Hardware so as to include many lines which in the changes taking place in maufacturing and distributing methods are not able to stand alone as a separate branch of business. Owing to these influences the old time Harness shop has become practically a thing of the past except in the larger towns and cities, where separate establishments for making and selling this line can be maintained. The facility with which factory made Harness can be obtained obviously gives both the jobber and retailer an opportunity to take up this branch of business in a way that was impracticable a few years ago. The jobbers' catalogues are more and more bearing evidence of the extent to which this line is drifting into Hardware channels, where, if it cannot remain a distinct branch, it certainly belongs more appropriately than with any other class of trade.

Whether the jobber will continue to be simply a distributer of goods or will more and more take up their manufacture is a question which commands the attention of those who are studying the larger movements of trade. With most jobbing houses there is undoubtedly comparatively little attempt to manufacture or control the manufacture of the goods which they handle, finding it more advantageous to avail themselves of the results of service which manufacturers are so competent and so willing to render, and to remain free lances in buying wherever they can to the best advantage. There are, however, tendencies which lead in the other direction and the manufacture of goods by the jobbing trade is apparently increasing. It is understood, for example, that some of the largest jobbing houses control, if they do not own, a number of smaller factories, disposing of their entire product. These factories are generally in the line of specialties, and the goods often, though not always, bear the jobber's special brands. Another illustration of the same thing is seen in the fact that a great jobbing house announce that recently they have equipped their own factory for the manufacture of Saddlery and Harness Goods, furnishing it with the most approved and up to date machinery. Other instances will occur to the trade of jobbing houses under one influence or another taking up the making of articles which in most cases are purchased by their competitors from the manufacturers. The question as to the extent to which this tendency may develop is one of some general interest. It may be presumed that whatever movement there is in this direction will have as its object that the merchants in question may have the manufacturer's as well as the distributer's profit in the marketing of goods. While some considerations may seen to favor this departure from the usual course of things it is obviously contrary to the general trend, which tends to the establishment and maintenance of great factories, doing things on a very extensive scale, in place of the smaller factories which have until recently been representative of Hardware producing methods, and which are still far from being a thing of the past. Notwithstanding the prominence of the great manufacturing concerns the presence in the market of a large and probably on the whole an increasing number of small concerns is an interesting and encouraging feature.

Condition of Trade.

Trade in all departments is diminished by holiday influences and the near approach of the end of the year. The holiday trade in many stores gives an exceptional activity, which keeps establishments much more busy than is usually the case. Even at this late date there is some holiday buying, almost exclusively in rush orders to fill up gaps in the stock. The general effect of the holiday season, however, is to make business quiet, as salesmen are withdrawn from the road and active efforts for securing orders are discontinued for the time being; the matter of the annual inventory becomes a pressing one and the attention of the office is given to closing up affairs and accounts for the year and the making of plans for the future. There are this week few changes in prices to record and the opportunities for judging the tone of the market are not as ample as in busier times. There appears, however, to be a slightly better feeling in regard to Hardware prices in general than has prevailed for the past month or two. The recent purchase of great outside concerns by the United States Steel Corporation is apparently having a very good effect on the market as a whole. It certainly gives increased confidence to the stability of prices in Wire and Nails, but there are indications that it will have, for a time at least, a steadying effect in other branches of trade. The year appears to draw to a close with a very hopeful feeling and the anticipation of a large volume of business without too early or too radical a reduction in existing prices. With most mercantile and manufacturing establishments in the lines in which our readers are interested it is to be presumed that the results of the year's business will be satisfactory. This should not only give the spirit of cheer which befits the season, but a confidence and courage in looking to the future and planning for continued and, if may be, enlarged prosperity. Wishing to our readers ample measure of happiness and success, we extend to one and all the greetings of the closing and the opening year.

Chicago.

(By Telegraph.)

Christmas distractions have been little felt in local Hardware jobbing interests, the number of orders in hand insuring continued activity for the remainder of the year and not a little business already booked for spring shipment. The general report is that December, 1902, will show a substantial increase over the corresponding month o year ago. In fact, the proportionate increase will be considerably larger than that for the year, which is estimated to range from 10 to 15 per cent., with exceptional instances of larger gains. There has been a fair movement in the general line of Staple and Shelf Hardware during the week, with a very heavy order trade for Skates, Sleds, Snow Shovels and kindred goods. Some jobbers have received orders for Skates, two or three fold greater than a year ago, and others have been compelled to pass orders, which broken stocks would not admit of filling. Some very satisfactory orders are already in hand for Wire Cloth, Poultry Netting, Screen Doors and Windows, as well as Steel Goods, for spring shipment. The demand for Wire Nails and Wire has continued exceptionally heavy, and some independent mills, as a means of protection against booking too heavy business, have advanced prices of Nails 5 cents per keg. This is without special significance otherwise, however, as the general market is unchanged, although there is a general feeling in the trade that better prices will prevail early in the year. It is intimated that prices for Chisels may be advanced early in 1903. On the other

hand, the anticipated decline in the price of Tin Goods has come to pass, with also a reduction of about 7½ per cent. in Enameled Goods. Spring Hinges have been advanced quite sharply by some manufacturers. In Heavy Hardware lines trade has been very satisfactory, beyond the usual proportions at this season of the year. Manufacturers of Builders' Hardware have captured some further important orders during the week for spring delivery, but of course trade for quick shipment is light. It is now pretty generally conceded that there will be no concerted advance in these goods, at least not in the immediate future. The increased capacity of some manufacturers will enable them to give much better deliveries of goods during the coming season.

St. Louis.

(By Telegraph.)

The Hardware market is substantially in the same position as when last reported, and the year will close with firm and healthy conditions prevailing, and prospects for the new year of a high order. Some severe winter storms have been experienced in some of the outlying territory, and this perhaps has served as a slight check on the volume of new buying. It perhaps can be truthfully said that the call for holiday goods this season has been on a larger scale than heretofore, and this is proof that the Christmas season in the country generally is being more heartily observed. With some of the jobbers a general homecoming of the road force is in order, but with others only a part of their men are coming in. The annual inventory time is now with us, and combined with the attention necessary to regular shipments on orders, keeps the working force in store and warehouse very busy.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—With clearings last week showing an increase of 30 per cent., and no stuffing or padding, Portland and San Francisco clearing in cash, as do the larger Eastern cities, being the only two cities on the coast that do, things look all right to us.

Since our last a wheat charter has been made at a figure never before touched in the history of our port, and one that will not show much profit to the owners. When charters reach these low figures it is all right to let the French and English own the bottoms. We do not want any ship subsidy under these conditions.

November 30 the first of six steamers left Antwerp loaded with Rails for this port, 30,000 tons of which are to come for relaying track in Oregon. It is many years since the market has admitted an importation foreign like the above.

Trade is holding up remarkably well for the season, and the holiday business promises to be of unusual volume. We do not share in this, however, except indirectly, as we aim to do an exclusively wholesale business.

Collections are better than we have ever known them in the history of our house.

NOTES ON PRICES.

Wire Nails.—Demand is of a satisfactory character, including specifications on old contracts and the placing of orders by jobbers earlier than usual, in anticipation of delays in delivery incident to insufficient transportation facilities. The manufacturers are indisposed to accept orders, except for reasonably prompt shipment. All the indications point to a satisfactory spring trade. Quotations are as follows:

Jobbers, carload lots	$1.85
Retailers, carload lots	1.90
Retailers, less than carloads	2.00

New York.—The closing down of building operations, to a large extent, has effected the demand for small lots from store unfavorably. Quotations are as follows: Single carloads, $2.05; small lots from store, $2.10.

Chicago, by Telegraph.—Manufacturers have continued to be overwhelmed with business, and some independent mills have endeavored to discourage additional trade by advancing prices 5 cents per keg; this is otherwise without special significance, however. The jobbing trade has been very active, and the market has ruled firm with the following prices readily realized. Official prices have continued firm at $2 in carload lots and $2.10 in less than carload lots, mill shipment, Chicago.

St. Louis, by Telegraph.—Business in Wire Nails with the jobbing trade from local sources has been very good, owing to the open season thus far, which has enabled building operations to be carried on very extensively. From outside sources the demand has been of moderate proportions. The quotation at this time in small lots from stock is $2.15.

Cut Nails.—The market is strong and Iron Cut Nails continue scarce. The demand for Steel Cut Nails continues, but prompt shipment is delayed, owing to the congested condition of the railroads. Quotations are as follows: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—The market is firm, but inactive, owing to the curtailing of building operations at this point. Quotations for carloads and less than carloads are as follows:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—There has been a fair order trade, and the market has continued strong, with occasional difficulty experienced in getting prompt service, due to the continued congestion of railroad traffic, which at this point seems more severe than heretofore. Prices are unchanged, sales being made on the basis of $2.15 in carload lots and $2.20 to $2.25 in less than carload lots for Steel, Chicago. Iron Nails are sold on the basis of $2.30 in jobbing lots from store, Chicago.

St. Louis, by Telegraph.—Cut Nails have been in good demand from the jobbing trade, and in small lots from store $2.35 is quoted.

Barb Wire.—A fair tonnage, especially from the West, is being placed, and it is expected that there will be an unusually large spring trade. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Chicago, by Telegraph.—There has been little, if any, cessation in the previous active demand experienced during the week, and taken in the aggregate the volume of business during December will show a substantial increase over December a year ago. Official quotations for Galvanized are $2.60 for carload lots and $2.70 for less than carload lots. Painted sells at $2.30 in carload lots and $2.40 in less than carload lots, Chicago. There is a fair demand for Staples, and the market remains steady at $2.05 in carload lots and $2.15 in less than carload lots.

St. Louis, by Telegraph.—Jobbers report Barb Wire trade in fair condition and prospects are bright for a good volume of spring demand. Jobbers quote in small lots from store, Painted $2.50 and Galvanized at $2.80.

Plain Wire.—Specifications on contracts are coming in in larger number than for some time, and an improvement in current business is noted, notwithstanding the advanced season. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.75
Retailers, carloads	1.80
Less than carloads	1.90

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	10	11	12&12½	13	14	15	16	17	18	
Base	$0.05	.10	.15	.25	.35	.45	.55	.70	.85	Plain.
$0.30	.35	.40	.45	.55	.65	1.05	1.15	1.70	1.85	Galv.

Chicago, by Telegraph.—The jobbing trade has reflected unusual activity among manufacturers. Shipments during the week have been urgent and manufacturers are overwhelmed with business. A strong tone has continued to prevail, with prices unchanged. Nos. 6 to 9 in carload lots are quoted at $1.90 on track and $2 from store, Galvanized selling at 30 cents extra for Nos. 4 to 14, spot.

St. Louis, by Telegraph.—The movement of Plain Wire as reported by the jobbing trade the past week has been of a moderate volume. In small lots from store No. 9 brings $2.05 and Galvanized $2.35.

Cordage.—The dullness which is usual near the termination of the year is prominent in the Rope market. The closing of navigation and the uncertainty of the market for raw material both affect demand. Manila Rope is quoted, on the basis of 7-16 inch and larger, at 11 to 11½ cents per pound. Sisal Rope, on the same basis, is quoted at 7¾ to 9½ cents. These quotations represent quality.

Glass.—The meeting held at Pittsburgh last week resulted in the National Window Glass Jobbers' Association placing an order for 1,200,000 boxes of Glass to be delivered before March 1. This order will be filled by the American Window Glass Company, the Federation Glass Company and the Independent Glass Company. The price paid is said to be 90 and 2½ per cent. discount off the manufacturers' new list. The following is the price-list adopted by the Jobbers' Association on December 16, 1902, and which went into effect December 22:

United inches.	Bracket. Sizes.	AA.	Single. A.	B.
25	6 x 8 to 10 x 15	$33.00	$29.00	$27.00
34	11 x 14 / 12 x 13 to 14 x 20	39.00	32.00	30.00
40	10 x 26 to 16 x 24	39.50	33.00	31.00
50	18 x 22 / 20 x 20 to 20 x 30	51.00	43.00	38.00
54	15 x 36 to 24 x 30	55.00	46.00	40.00
60	26 x 28 to 24 x 36	59.00	49.50	43.00
70	26 x 34 / 28 x 32 / 30 x 30 to 30 x 40	68.00	57.00	48.00
80	32 x 38 / 34 x 36 to 30 x 50	72.00	63.50	55.50
84	30 x 52 to 30 x 54	76.00	69.50	60.00

United inches.	Bracket. Sizes.	AA.	Double. A.	B.
25	6 x 8 to 10 x 15	$52.00	$44.00	$37.00
34	11 x 14 / 12 x 13 to 14 x 20	56.00	47.50	45.50
40	10 x 26 to 16 x 24	63.00	49.50	48.00
50	18 x 22 / 20 x 20 to 20 x 30	67.00	57.50	55.00
54	15 x 36 to 24 x 30	69.50	61.50	56.00
60	26 x 28 to 24 x 36	71.00	63.00	57.50
70	26 x 34 / 28 x 32 / 30 x 30 to 30 x 40	76.00	71.00	65.50
80	32 x 38 / 34 x 36 to 30 x 50	82.00	74.00	68.00
84	30 x 52 to 30 x 54	83.50	75.50	69.50
90	30 x 56 to 34 x 56	88.00	80.00	74.00
94	34 x 58 to 34 x 60	90.00	82.00	75.50
100	36 x 60 to 40 x 60	107.00	96.00	89.50
105	40 x 62 to 40 x 64	114.00	105.00	96.00
110	40 x 66 to 40 x 70	127.00	117.50	109.00
115	40 x 72 to 40 x 74	143.00	131.00	121.50
120	40 x 76 to 40 x 80	168.00	153.50	144.00
125	40 x 82 to 40 x 84	181.50	167.00	157.50
130	40 x 86 to 40 x 90	195.00	180.00	171.00

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes over 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket. All Glass 54 inches wide or wider, not making more than 116 united inches, will be charged in the 120 united inches bracket.

This is the list from which the jobbers will sell to the trade. The discounts to which the list is subject are as follows:

Small lots from store.....90 and 10 %
Carloads, f.o.b. factory.....90 and 20 and 2½ %

Oils.—*Linseed Oil.*—Business is light and is confined to orders for small lots. It is anticipated that after the first of the year buying will be on a more liberal scale. The market is firm at the following quotations: City Raw, according to quantity, from 46 cents per gallon; State and Western brands, 45 cents per gallon.

Spirits Turpentine.—The market is strong, with an unusual demand for this season. Prices, according to quantity, are as follows: Southerns, 55 to 55½ cents; Machine Made Barrels, 55½ to 56 cents per gallon.

Steel Goods.—An advance of 5 per cent. on the regular line of Steel Goods was made last week by the American Fork & Hoe Company.

PRICE-LISTS, CIRCULARS, &c.

Supplee Hardware Company, 503 Market street, Philadelphia, Pa.: Catalogue and price-list for 1903 of Pennsylvania, Continental, American, Quaker City, Girard, Electra and Westfield Lawn Mowers; also Grass Catchers, &c. Attention is called to a new side draft attachment for horse mowers, a high grass and weed buckler attached to Horse Mowers and a grass catcher for Horse Mowers. A special feature found in this line of Mowers is the self sharpening action, which, it is remarked, does away with the annual charge for grinding Mowers.

Johnson & Field Mfg. Company, Racine, Wis.: Catalogue illustrating and describing Farm and Warehouse Mills, Separators, Farming and Chaffing Mills, &c. A special line of these goods is made for export. Warehouse Mills with elevator and bagger attachment have just been put on the market by the company.

The Miller Keyless Lock Company, Kent, Ohio: Catalogue illustrating Labyrinth Locks. These are Locks without keys for all purposes.

The Monarch Refrigerator Works, Burlington, Vt., issue a 1903 catalogue of the Monarch Cleanable Dry Air Refrigerators. They have removable cleanable flues, removable ice chambers and are lined with zinc or nickeloid. Family Refrigerators are made with oak and ash cases, sideboard styles have ash cases, as also have Ice Chests and Grocers' Refrigerators. In addition to these goods the company manufacture to order large cooling rooms for butchers, grocers, hotels, restaurants, hospitals, &c., made in sections, which can be set up or taken apart in a short time by customers.

A. W. Harris Oil Company, Providence, R. I.: Catalogue relating to Valve and Engine Oils, for valves, cylinders, gas and naphtha engines, dynamos, &c.

The Samson Cordage Works, 115 Congress street, Boston, Mass.: Catalogue relating to Sash Cord, &c. Attention is especially directed to the Samson Spot Cord, Clothes Lines, Wire Center Cord and Cord Attachments.

The Keystone Valve & Mfg. Company, 2626 Carson street, Pittsburgh, Pa.: Catalogue of Straight-way, Three-way, Four-way Locomotive Blow Off Valves; also Valves for hydraulic service, boiler blow off and compressed air lines. These goods are tested and inspected before shipment.

The Indiana Foundry Company, Indiana, Pa.: Illustrated catalogue and price-list relating to Stump Pullers, Lawn or Garden Rollers, Farm Bells, Cant Hooks, Saw Gummers, Grate Bars, Lumber Trucks and Wheels, Oven Doors, Tuyere Irons, &c. Improvements have been made in the proportions of the Sutton Tuyeres during the year.

The Colt's Patent Fire Arms Mfg. Company, Hartford, Conn.: Illustrated descriptive catalogue of Colt's Revolvers. Included is an illustration of the improvements in the regular sporting model of the Automatic Pistol, together with illustration and description of the new military model, with increased capacity of magazine, special long handle, &c.

A. V. Taylor & Co., Cincinnati, Ohio, manufacturers of White Enamel Letters, have made arrangements with Morse-Klinker Company, San Francisco, Cal., to act as general agents for their Handy House Numbers. The latter will supply the trade in California and carry a large stock, to enable them to fill orders promptly. The sale of these House Numbers has exceeded the expectations, and the manufacturers are booking orders faster than their present facilities will permit and are arranging to add equipment that will enable them to meet the demand.

Correspondence.

American Hardware Manufacturers' Association.

To the Editor: I note that in your issue of the 11th "Veritas" proceeds to take issue with the views expressed in my communication, published in your issue of the 4th, and that in the current number "Sherwood" and "Jobber" also take up the cudgel. Evidently I am not what might be considered "popular."

With no idea of prolonging a controversy, I might say briefly, however, that none of these gentlemen convinces me that the American Hardware Manufacturers' Association thus far has accomplished, or even striven for, any specific results. I could quote from the three articles referred to to the effect that the manufacturers' and jobbers' associations "are getting closer together;" that the jobbers attend their conventions because "their warm friends among the manufacturers will be there to welcome them;" that the two associations "jointly discussed certain questions to our mutual advantage and profit," &c., &c.; but these things do not furnish any evidence of concrete benefits to the manufacturers. I am surprised that "Sherwood" states in his article that "it is a grave question whether it is wisdom" for the manufacturers to try to agree upon certain policies. If they are afraid to combine for the sake of securing better permanent policies, then, in my judgment, there is little value in a membership in the organization.

These three writers seem to think that I have attended none of the conventions of the Manufacturers' Association. As a matter of fact, I did attend that at Atlantic City in June of the present year. At that convention there was one gentleman who had the courage to bring forward a specific proposition that the association should come to some sort of an agreement as to the attitude of the members toward syndicate buyers. This was a matter which, perhaps, more than any other, ought to have been discussed, as there is no greater crying evil to-day in the Hardware trade than the syndicate buying system. Strange to say, however, there was an apparent disposition to at once "fly to cover" and avoid if possible any general discussion of this subject.

This matter relating to syndicate buyers and the one referred to in my previous communication, bearing on possible troubles with labor organizations, are two questions of highest importance, which associated manufacturers might well take up seriously and wrestle with. If we could show that 180 manufacturers only were willing to stand together on policies dealing with these matters, it would create an influence which would soon draw vastly larger numbers of members into our ranks. Earnest efforts along such specific lines would do more to make the American Hardware Manufacturers' Association a success than any amount of felicitous entertainment accorded to such "jobbers" as are able to attend conventions. In passing it might just as well be noted that there are many of us who sell more largely to the manufacturing trade than to the jobbers. While, of course, the Hardware jobbing trade is a most important one, there are many makers of Hardware who sell more largely to car builders, and to Furniture, Woodenware and Agricultural Implement manufacturers than they do to the former.

Permit me to thank you, Mr. Editor, for the use of this space and to assure you that I hope it will be some time before I am again in the position of being your debtor for a favor of this kind. WIRES.

IOWA RETAIL HARDWARE DEALERS' ASSOCIATION.

THE next annual meeting of the Iowa Retail Hardware Dealers' Association will be held at Des Moines, February 11-13, 1903. The headquarters will be at the Kirkwood Hotel. The formal programme of the meeting has not yet been issued, but there is every indication that the gathering will be an interesting and instructive one.

HARDWARE MUTUAL FIRE INSURANCE.

WE are in receipt of the following inquiry from a Hardware merchant in Virginia:

Do you know of any Hardware mutual fire insurance companies that do business outside their own State? Do they all limit business to members of associations? This State has no association, so we cannot be identified with one.

We also have another request for information of this sort from a Hardware firm in New Jersey:

Will you kindly advise us if there are any mutual Hardware fire insurance companies who take risks in this part of the country, and if so to whom to apply

Several of the State retail Hardware associations have established mutual fire insurance companies which are conducted under their auspices and by men prominently connected with the associations. These associations, however, with one or two exceptions, limit the placing of insurance with them to merchants in their own State, and in all cases the privilege is confined to members of Hardware associations exclusively. We should, however, be glad to hear from those interested in Hardware association insurance in reply to the above letters, and whether or not they would consider insuring a merchant of standing and responsibility in a State not yet possessing a Hardware organization.

BUTLER BROTHERS' NEW CHICAGO HOME.

BUTLER BROS., Chicago, New York and St. Louis, have just occupied the two new buildings recently completed in the first named city, the size and location of which give them great advantages for the quick and economical handling of incoming and outgoing merchandise, effecting great savings in both time and money in the transaction of their extensive business. The buildings cover nearly two blocks, and are connected by a subway underneath Randolph street. Some idea of the scope and capacity of the new plant is afforded by the following figures, the buildings being on the west side of the Chicago River, between Lake and Washington streets. The north building (that nearest Lake street) is 380 feet long and 86 feet wide. The south building is 238 feet long and 85 feet wide, both 13 stories high except the extreme north end, which is ten stories. There is over 600,000 square feet of floor area, equivalent to 16 acres, and 676 feet of unbroken shipping platform bordering on joint railway tracks used by five great trunk systems. A private track nearly 700 feet long runs along the entire east front of the property. A full description with numerous illustrations of the new warehouses is given in a four-page circular, entitled "The New Home of Our Chicago House," which with their catalogue will be sent to the trade on application.

CHALLENGE REFRIGERATOR COMPANY.

THE CHALLENGE REFRIGERATOR COMPANY, Grand Haven, Mich., have issued a series of catalogues for 1903. The merits of the Grand Hard Wood Refrigerator are set forth in a catalogue bound in blue and silver, fully illustrated, showing the various designs manufactured, with sectional drawings explaining the theory of circulation of air. The catalogue of the Victor lines contains a frontispiece of various views, showing the expansion of the company from 1883 to the present day. The "talking points" of the Victor are set forth in detail. The catalogue devoted to the Triumph Refrigerators, which are white enamel lined, is appropriately bound in white and gold. Each illustration is accompanied by dimensions and price-list.

Walter R. Perrin, Gouverneur, N. Y., who recently disposed of his drug business, has purchased the Lorenzo Smith half interest in the Cutting Hardware store. The firm style is now Cutting & Perrin.

BILLINGS & SPENCER COMPANY'S NEW CATALOGUE.

THE BILLINGS & SPENCER COMPANY, Hartford, Conn., have recently issued a new catalogue of Machinists' Tools and Drop Forgings of every description made by them in copper, bronze, iron and steel. The book contains 119 pages, and is copiously illustrated, goods regularly made being shown in great variety, although the company are competent to execute special orders for anything in fine Drop Forgings, making their own dies. On page 47 is shown C. E. Billings' Combination Caliper Square Depth Gauge, and 2-inch and 5-inch Steel Rules, new tools. Pages 117 and 118 direct attention to special Drop Forgings, how to get estimates, quality, &c. They also allude to the Lathe Dogs of their production, the entire line now being made heavier, thus adapting them to modern requirements for heavier work.

SIMMONS' SADDLERY AND SADDLERY HARDWARE CATALOGUE.

SIMMONS HARDWARE COMPANY, St. Louis, Mo., issue catalague No. 433, pertaining to Saddlery and Saddlery Hardware manufactured by them. This illustrates a complete line of these goods, with prices and descriptive data. The company for some time have been carrying certain kinds of Horse Goods, but now have a complete line. They have equipped their own factory with the best and latest machinery, and refer to the fact that they use materials of high grade and employ workmen who are carefully chosen and are proficient in their line. They allude to the demand which has been made upon them for a complete line of Harness and Saddlery Goods, which with their present facilities they are enabled to supply.

THE BUSH HARDWARE COMPANY'S WINDOW DISPLAY.

THE BUSH HARDWARE COMPANY, Columbus, Ga., recently made an imposing display in one of their large show windows of a large quantity of Loaded Shells. These were arranged in terraces, some of the boxes being placed at angles, the rows being interspersed with Shells, alternately standing up and lying down. Rifles stood in the corners of the window, and Hunting Clothing was hung in the background.

GEO. BROWN'S FIRE.

THE trade will regret to learn of the almost total destruction by fire of the large establishment of Geo. Brown, Knoxville, Tenn. The loss is not far from $200,000, but we understand this is pretty well covered by insurance. While the concern are, we are advised, financially well able to resume business, no decision as to their future course has yet been reached.

THE T. C. RICHARDS COMPANY, Winsted, Conn., advise us that while they have sold to the American Screw Company their machinery for the manufacture of Wood Screws with heads, commonly known to the trade as Wood Screws, together with all appurtenances and the good will of this part of their business, they have retained all the machinery and appurtenances for the manufacture of Wood Screw Goods without heads. The latter they will make in larger quantities with much increased facilities. This line includes Screw Eyes, Screw Hooks, Gate Hooks and Eyes, Meat Hooks, Straight Hooks, Cornice Hooks and Eyes, Double Screws, patent Winged Screws, Winged and Collared Screws, Pinch Shank Screws and Wood Screw Threaded Wires of all the usual lengths and thicknesses; a full line of Cup and Shoulder Hooks, with Wood Screw threads; also Coat and Hat Hooks, Tassel Hooks, Hammock Hooks and other goods with Wood Screw threads.

TRADE ITEMS.

THE COLDWELL LAWN MOWER COMPANY, Newburgh, N. Y., recently posted a notice in their factory that commencing January 1, 1903, all help employed in their shops in any capacity would be credited a full day's work on the completion of nine hours. In other words, all the employees would be paid for a full day's work of ten hours, as heretofore, for nine hours' labor, thus getting the same pay and an extra hour for their own improvement. This was entirely voluntary on the company's part, and was a complete surprise to those concerned, being in line with the liberal treatment always accorded to the employees.

THE S. OBERMAYER COMPANY, Cincinnati, Ohio, issue a circular in which they state that on account of the present badly congested condition of railways generally and with still less encouraging future indications, they would suggest to their friends and customers the anticipation of their wants and the placing of orders for goods in their line as much in advance as possible. The company are always ready to fill orders promptly—their invariable rule being to make deliveries to transportation companies on the same date order is received—and responsibility for any delay thus rests with the railroads.

THE CAMMILLUS CUTLERY COMPANY, Cammillus, N. Y., Adolph Kastor & Bros., 109 Duane street, New York, proprietors, have now fully finished and equipped the additional building which has been built alongside the original factory, and it is now in complete working condition. The buildings now cover a site 50 x 200 feet and are three stories high, the enlargement more than doubling their capacity, we are authoritatively informed. The plant is supplied with an electric motor and the necessary installation for supplying their own electric light. The company manufacture full lines of Pocket Knives of high grade, every blade of which we are told is made of S. & C. Wardlow Cutlery steel.

ADVANCE THRESHER COMPANY, Battle Creek, Mich., announce the resignation of J. J. Lumm, who has acted as their purchasing agent for several years and who on January 1 becomes associated with the Battle Creek Iron Works Company as general manager. O. J. Cessna, who has been connected with the Advance Thresher Company for upward of eight years, has been appointed his successor.

THE office of Rogers Universal Cost System has been removed from Keene, N. H., to Bantam, Conn., and the title changed to Industrial Timekeeping & Cost System, to whom all correspondence should be addressed. This industry is only three months old, but in that time, we are advised, has taken orders for ten complete factory equipments.

F. H. OGDEN, formerly secretary and manager of the Ogden Mfg. Company, Newark, N. J., and with the Reading Hardware Company, Reading, Pa., since their purchase of the above plant, will retire from the Reading Company's service with the close of the year and return to New York after taking a few weeks' vacation.

THEODORE D. PECK, who has been with the Russell & Erwin Mfg. Company about 14 years, will leave that concern January 1, to enter the employ of Post & Flagg, Stock Exchange brokers, New York. He will take charge of the correspondence of the firm. Mr. Peck filled an important position with the Russell & Erwin Mfg. Company, having at one time been their resident Chicago representative and subsequently handling the sales of important Hardware jobbing houses.

IN November Judson H. Cornish, treasurer of the Sturges, Cornish & Burn Company, was succeeded by George C. Prouty, and it is now announced that on December 8 the name of the company was changed from Sturges, Cornish & Burn Company to Sturges & Burn Mfg. Company. The company are manufacturers of Sheet Metal Specialties.

N. B. Graves' Hardware store in Redwood City, Cal., was robbed of over $500 worth of goods some weeks since. The thieves have since been arrested and most of the stolen articles recovered.

A CHRISTMAS ADVERTISEMENT.

The accompanying advertisement is a reproduction, reduced, of a page used by the Albany Hardware & Iron Company of Albany, N. Y., to stimulate holiday trade. The advertisement appeared on December 15

A Christmas Advertisement.

and was printed in two colors. It will be noticed that the goods mentioned include a large proportion of articles that can be found in a Hardware store any time during the year. However, presented in this attractive way at Christmas time, they doubtless recommended themselves as appropriate gifts to those who were on the lookout for suggestions of this sort. The principles of advertising here illustrated are obviously applicable at any season.

Charles Leonard, the veteran wholesale and retail Hardware merchant, Petersburg, Va., has purchased the building adjoining his store, remodeling it and connecting it with the establishment which he has occupied for upward of 40 years. The two buildings are three stories high and have a frontage of 75 feet and a depth of 275 feet, thus making an imposing establishment. A small boy, Mr. Leonard came to Petersburg from London, England, in 1830. In 1840 he began to learn the Gun trade, and in 1845 he went into the Hardware business for himself on Old street. When the Civil War broke out Mr. Leonard was doing business on Sycamore street. During all the years that Mr. Leonard has been in business he has never had a fire nor been involved in any financial troubles.

Collins Brothers, Winchester, Tenn., whose Hardware store was badly damaged by fire a few weeks since, have again resumed business at the old stand. The store has been thoroughly overhauled and presents a new and attractive appearance. The firm were awarded insurance to the amount of $2090.

SECURING DEPARTMENT STORE AND CATALOGUE HOUSE BUSINESS.

The A. B. Brock Company, Loveland, Ohio, are making a determined effort to convince the people in their neighborhood of the advisability of buying at home, instead of sending money to department stores and catalogue houses. For this purpose they have issued an attractive six-page folder, in which the subject is treated at considerable length. The matter is presented as follows:

MANY PEOPLE

Have got to thinking that they can buy cheaper of the department stores and catalogue houses of Chicago, Cincinnati and elsewhere. They think their home merchants charge more than a reasonable profit, and in too many cases we are sorry to admit it is true. We propose to meet the prices of the department stores or catalogue houses. All we ask is that you deal with us on the same basis that you deal with the catalogue houses, and give us the same amount of time to get the goods which it would require to order from them. Plank your money down when you order the goods, and we will meet each and every price they make, and furnish you the same grade of goods they offer you.

Some people prefer to buy away from home because it sounds big to be able to say they ordered from Chicago. They too often forget about the freight, about the goods coming wrong and the trouble it takes to get them exchanged. We know of parties who are actually paying more for goods bought away from Loveland than they could buy them of their home dealer. For this kind of people we can do nothing; but for those who are making the dollar go just as far as they can we can and will do something.

Give us a trial on the proposition we make. If you are one of those who trade away from home. Bring your catalogue with you. If we fail to furnish the goods without a reasonable excuse, don't give us your confidence again. Try us once. We don't fear the results. We are residents of Loveland; we are your home merchants; we help pay taxes; we have to live and must consume some of your products.

Is there anything wrong about our proposition?

The whole trouble with some of the people about Loveland is the same with which so many communities are suffering—that old slow coach, "Credit." Some of it so slow we never get it. No merchant can sell goods cheap on that plan. The dollar invested in goods to-day and sold for cash to-morrow can be invested in more goods the following day, and the same process of sale can be repeated. But the dollar invested in goods to-day and sold on credit to-morrow is tied up so long as you don't get it back again. Can you wonder why the catalogue house has the advantage in prices over most of your home merchants? The catalogue house won't trust you. Their goods are either sent C. O. D., which makes extra expense, or they demand the money in advance with no goods in sight. The home merchant often trusts to his sorrow.

Treat your home merchant like you are compelled to treat the catalogue house, and we think you will get better results.

Our constant aim is to increase our business by honest and fair treatment of customers, and selling as low as the lowest.

If we make a mistake we are glad to be told of it, for a spoken complaint is nearly always curable, and we are more anxious than you are to have the matter straightened out; but we cannot do so unless you tell us your grievance.

We handle a full line of Hardware, Tinware, Stoves, Ranges, Bicycles, Sewing Machines, Paints, Oils, Varnishes, Brushes, Kitchen Supplies and everything usually kept in a Hardware store, and are also headquarters for Farming Implements, Wagons, Buggies, Mill Feed, Coal, Lumber and all kinds of Building Materials.

Call and see us. Yours respectfully,

THE A. B. BROCK COMPANY,
Loveland, Ohio.

J. Mertes & Co., Hardware merchants, are about to remove from Choctaw to Prague, Lincoln County, O. T., opening up at the latter point on January 1.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., Dec. 13, 1902.

The Week's Hardware Trade.

AS we are approaching the end of the year the prospects become no more cheering than they have been during the past two or three months. While certain Hardware goods are in fair demand, it is none the less an unfortunate fact that, taking trade as a whole, it is becoming more and more slack. In this country we do not open the New Year with anything approaching the prosperous conditions which obtain in the United States. It has already been pointed out in a Hardware editorial in *The Iron Age* that when trade is slack in Great Britain it means cheap selling of British goods in neutral markets to the detriment, more or less, of American exporters. This is a fact, and there is evidence of increased shipments of bulk on export account, which go to show that British manufacturers and merchants are endeavoring to make up for the weakness of the home market by increased activities on overseas account. This is palpably the case in Cutlery, Hardware, Implements and Tools, Wire, Galvanized Sheets, Tin Plates, Cast and Wrought Iron and Black Plates. A few facts as to export of these goods will enable American merchants to grasp the situation. Thus the exports of Cutlery have increased to the following countries: Germany, Holland, Brazil, Argentine, South Africa and Canada. Increased purchases of general Hardware are recorded to Germany, Spain, Chile, Brazil, Argentine, South Africa, India and Canada. Galvanized Sheets have been selling much more freely to Germany, Holland, Spain, India, Central America, Chile, Brazil, Uruguay, Argentine, Canada. Tin Plates have increased in export to Germany, France, Portugal, Italy, Roumania, Brazil, Argentine and Canada. Cast and Wrought Iron goods show increases to Spain, Italy, West Indies, Peru, Chile, Brazil, Argentine, South Africa, India, Australasia, Canada. Wire shows an increase of sale to the United States, Brazil and miscellaneous countries. I need not worry readers with figures. It is enough to state that in the cases I have mentioned a substantial increase of trade has been done. It is perfectly true that in other countries there have been setbacks, but taking the trade as a whole there has been an increased export of metals and articles manufactured from metals. Particular attention should be drawn to the markets which distinctly affect America. The possible settlement of differences between Chile and Peru are shown in increased purchases by those countries of Cutlery, Hardware, Rails, Galvanized Sheets, Cast and Wrought Iron goods. The removal of restrictions upon the cattle trade in Argentine, coupled with a marked steadying of the financial market, is indicated by increased purchases of practically every kind of import and in particular the goods mentioned above. It will thus be seen from these facts that while the American home market is so good as to keep American manufacturers busy for home consumption, they are losing in neutral markets, and in particular markets which in point of proximity are distinctly American rather than British. Of course in the South American countries noted above it must be remembered that British shipping transit is superior at present to American transit; but you will never get the necessary shipping facilities until a much larger volume of trade can be guaranteed with those countries. The Canadian market, too, has been quite brisk in its demand for all the goods usually handled by Hardware and metal exporters. I put it to far-sighted American exporters whether, in point of fact, they are acting wisely in neglecting neutral markets even in times of prosperous home conditions. The great thing is to regulate the swing of the pendulum.

Imitation English Guns.

At the annual meeting of the Birmingham and Provincial Gun Makers' Association mention was made by the chairman of the growing practice of foreign made Guns bearing English names. As the subject is of equal interest to American makers, the chairman's remarks are worth notice. Since the last annual meeting they had had instances where Belgian proved Guns had borne English names, and if such instances came before the members of the association the Executive Committee would be pleased to have their attention drawn to them. They had not so far been able to get a case in which the evidence was sufficiently clear to make it certain that a conviction would follow if a prosecution was instituted; but it was desirable that something should be done to stop the practice, for when they saw Guns made and proved in Belgium bearing English names, it was calculated to mislead the purchaser. Not only that, but Belgian Guns often bore English words as well as marks; but whether that was strictly legal he did not know. Advice, however, was being taken on the subject, so that measures might be adopted for the protection of the English trade. If a purchaser in England bought a Gun marked with English words instead of French words he was justified in supposing that he was buying an English made Gun. He suggested that it ought to be possible for the English proof masters to have the authority possessed by the proof masters in Belgium to enter shops, stores and warehouses and examine the Guns in order to see whether they were properly proved. At present, if an English proof master had reason to suspect that such was not the case, he had to obtain a search warrant, which necessitated his going to the police. That was rather a serious step to take, and it would be infinitely better if the proof master had the power to walk into an establishment and examine the Guns. It had been suggested that the registration of Gun dealers would be a step in the right direction. There was no desire to introduce restrictive measures, but it might be useful to the trade if the dealers in Guns were licensed just as the dealers in petroleum, fireworks and things of a similar character were licensed.

The Decision of the English Nail Makers.

Last Wednesday a meeting of the Cut Nail manufacturers was held to receive the report of the committee appointed at the last meeting. The gathering included representatives from manufacturers in all the associated districts. The proceedings were private, but it was decided to maintain prices at their present level, and that in any case no change was contemplated before the date of the next meeting, which it was arranged should be held on a convenient date in March next.

Hardware in the Congo.

The following brief notes may be of some future interest to American exporters who take to cultivating trade with Africa. The Congo Free State is almost in the center of Africa, and although the trade is at the present moment small, it is practically certain to grow as the years go on. I also append one or two comments upon the exports of the Congo Free State. Is it not possible for Americans to buy some of the products of the Congo Free State and by that means obtain reciprocity of trade?

Hardware.—Hardware, other than Cooking Utensils, is imported chiefly from Germany, United Kingdom and France.

Iron Wares, Tools, &c.—Articles of this nature are imported from England, Belgium, Germany and France. but the trade is not large. The Congo Railway Company obtain their supplies direct from Belgium.

Kitchen Utensils.—These articles are imported from Germany, England and France. The French goods are most in demand.

Lamps.—Lamps are imported from Germany, England and France and are sold at prices varying from 5 to 15 francs each.

Cement.—Cement is imported from France, England and Belgium. The price is about 20 francs per barrel of 180 kg.

Galvanized Iron Sheets.—These Sheets for roofing purposes come from England, Germany and France. The price ranges from 5 to 8 francs per sheet.

The principal articles exported from the Congo Free

State are caoutchouc, ivory, gum copal (yellow, white and red), coffee, earth nuts and cocoanuts.

The exports in the last six months of 1901 were as follows: Caoutchouc, 2,850,080 kg.; ivory, 65,045 kg.; "escravelles" (little ivory points), 10,991 kg.; coffee, 47,866 kg.; gum copal, 188,146 kg.; earth nuts, 13,289 kg., and cocoanuts, 16,204 kg.

Gumption Wanted.

A hint is none the less useful because it is amusing. I may remark that Americans are just as famous for promiscuously sending out catalogues as are their British competitors. A local paper in Trinidad cites a curious instance of the zeal of British merchants to cultivate trade in Trinidad. It says: "Numbers of beautifully illustrated catalogues have been received, setting forth the manifold excellences and beauties of Fire Grates, Stoves, Fire Irons and other accessories for keeping rooms warm in cold climates. Where on earth do these British merchants imagine Trinidad to be? In the Arctic regions? Is it the outcome of ignorance or must we attribute their favors to the zeal which outstrips the discretion of the office boy in search of promotion? Much surprise is felt on turning over these catalogues to discover that there is no mention of Skates! Are we doomed to endure yet another winter without the delightful aids to healthful amusement? We are afraid we are!"

Sewing Machines in South and Central America.

One of the best tests of commercial stability in the growing use of Sewing Machines. Nomadic people never buy Sewing Machines, but those who are settled do. Further, Sewing Machines are easily handled by exporters, and are excellent advance agents for other Hardware lines to follow. I therefore append herewith some notes on the sale of Sewing Machines in South America. In view of the increased purchasing capacity of nearly all the South American States to which I have already alluded, what follows is useful not only for the specific information it gives concerning Sewing Machines, but as an indication of the general trend of trade currents:

MEXICO.

Mexico and San Luis Potosi.—The total imports of Sewing Machines (which are not shown in the official returns) are estimated on good authority to amount to nearly 35,000, of which nearly 30,000 are of United States origin. Several well-known firms have agencies in Mexico, and there are numerous commission agents who undertake the sale of these articles. As a rule, Sewing Machines are bought on the instalment system. The best time for travelers to visit Mexico is either from July to October or from October to March. The places visited should be Merida, Vera Cruz, Puebla, Mexico, Guadalajara, San Luis Potosi, Monterey, Torreon, Morelia, Chihuahua, Durango, Guaymas, Hermosillo and Mazatlan. The duty on Sewing Machines in Mexico is 5 centavos (centavo is the hundredth part of the Mexican dollar) per gross kilogram, and an additional duty of 10½ per cent. ad valorem is inforced.

Vera Cruz.—Eight hundred Sewing Machines were imported into Vera Cruz in the year 1901, of which three-fourths came from the United States and nearly one-fourth from Germany. The imports from the United Kingdom were very small.

Monterey.—There are one or two firms dealing in Sewing Machines and Bicycles in Monterey, but inquiries should be made as to the standing of any firm before business is opened up. The best time for travelers to visit Monterey is from October to March. The chief places visited should be Monterey, Saltillo, Laredo, Torreon, Monclova and Ciudad Porfirio Diaz.

CUBA.

Havana.—The imports of Sewing Machines and parts thereof in 1899 amounted in value to $43,393, in 1900 to $132,147, and in 1901 to $85,137. The following table shows the countries from which these Sewing Machines were imported:

	1901.
United States	$75,518
United Kingdom	1,617
Germany	7,864
France	55
Other countries	83
Total	$85,137

The most advantageous time for travelers to visit Cuba is the period from October to April, and the following places should be visited—viz.: Havana, Matanzas, Cienfuegos, Trinidad, Santa Cruz and Santiago. The duty on Sewing Machines and parts thereof imported into Cuba is 20 per cent. ad valorem. There are about seven dealers in Sewing Machines in Havana.

JAMAICA.

Kingston.—In the financial year 1900-1 Sewing Machines were imported to the value of $9000. Of this amount North America contributed $5400 worth, Germany $2800 and England $1500. A credit of six months is usually given. The best time for travelers to visit the island is in May and June. Kingston is the only town dealing in these articles. There is no duty on imported Sewing Machines.

BRAZIL.

Rio de Janeiro.—Accurate figures as to the importation of Sewing Machines are not available. American and English Machines are the most popular, while Hand Machines come almost exclusively from Germany. From May to September is the best time for travelers to visit the country. The towns dealing in Sewing Machines are Rio de Janeiro and Sao Paulo. A duty of 300 reis per kilo is levied. (One thousand reis make the Brazilian milreis, equivalent to $0.546 United States gold.)

ECUADOR.

Guayaquil.—In 1901 6572 Sewing Machines were imported, of which 5760 came from North America and 484 from the United Kingdom. From July to December is the best time for travelers to visit Ecuador. October to December is the best time for selling Sewing Machines. There is no duty on these articles in Ecuador.

WATERBURY BRASS COMPANY.

WATERBURY BRASS COMPANY, 122 to 130 Centre street, New York, are continually expanding their facilities and stock for the execution of hurry and nearby territory. Although for years they have made a specialty of drawing and spinning Brass, also wide Brass, with their new equipment they are enabled to carry in stock in New York Brass up to 24 inches wide, and it is their intention to stock Drawing Brass in standard widths and gauges for the convenience of the trade, together with Spinning Brass, from 4 to 24 inches wide, which will be assorted as follows: Four to 14 inches wide, 16 to 36 B. & S. gauge, inclusive; 16 inches wide, 18 to 32 B. & S. gauge, inclusive; 18 inches wide, 18 to 28 B. & S. gauge, inclusive, and 20, 22 and 24 inches wide, 18 to 26 gauge. They will also install a stock of Spinning Copper in rolls from 12 to 20 inches wide, inclusive, in various gauges. Another addition will be in the nature of a stock of Sheet Brass and Sheet Bronze in flat sheets, 6 to 14 inches wide, in random lengths, about 6 feet long, in a variety of thicknesses. Their stock of Brass Rods has been materially increased and now includes free turning Brass Rods from ⅛ to 1 inch by thirty-seconds and up to 2½ inches in diameter by sixteenths from 1 inch. A complete stock of Hexagon Rods for free turning or drilling rod is carried, straight and true to size. Attention is specially drawn to their Pope's Island White Metal, which is noncorrosive and has a permanency of color that makes it particularly desirable for covering sink boards, pantries, bar fixtures and for passenger coaches and for lavatories. Their stock of Sheet Copper, both cold rolled and soft, will be enlarged. Among other leading goods they carry are Seamless Brass Chisel Handle Ferrules, Sheet Brass Grommets, Screw Driver Handle Ferrules, Eyelets and Brass Checks.

Huske Hardware Company, Fayetteville, N. C., are expecting to erect a two-story brick store with basement, fronting 40 feet on Hay street and running back 140 feet. The new building will be connected overhead by bridge with present warehouse.

NATIONAL NOVELTY CORPORATION.

THE NATIONAL NOVELTY CORPORATION is the title of a consolidation of interests concerned with the manufacture of Hardware Specialties, Toys, both iron and wood, and Juvenile Goods, which includes 37 different concerns, the incorporation having been effected December 10, with a nominal capitalization of $37,000, which is only preparatory to a contemplated final incorporation with greatly increased capital some time early in the ensuing year. The firms represented in this proposed amalgamation, the final details of which are not as yet actually consummated, were all represented at a meeting held at the Imperial Hotel in Jersey City, December 9, 10, which, we are authoritatively advised, was remarkable in that all were of one mind and a unit on the question of consolidation. The same reasons as are usually given for consolidating are named in this instance—viz., economies in manufacture and distribution; no intention of advancing prices, and in some instances possible reductions on present figures. The plants are said to come in at conservative values and only such capitalization as is absolutely necessary will be permitted. This consolidation emanated from the manufacturers themselves and has not been fostered by promoters. The following list includes the names of the concerns to be consolidated, together with several departments that will be bought out, leaving the balance of the business in these particular cases under the same management as before:

R. Bliss Mfg. Company, Pawtucket, R. I.
J. H. Hawes Mfg. Company, Towanda, Pa.
M. E. Converse Company, Winchendon, Mass.
Whitney Reed Chair Company, Leominster, Mass.
Wilkinson Mfg. Company, Binghamton, N. Y.
F. W. Crandall Company, Elkland, Pa.
American Tool Chest Company, New York.
Thorndyke Turning Company, Baldwinsville, Mass.
Short Mfg. Company, North East, Pa.
A. O. Speare Company, Gardner, Mass.
South Bend Toy Mfg. Company, South Bend, Ind.
Garton Toy Company, Sheboygan, Wis.
Wooden Novelty Company, Coshocton, Ohio.
Kalamazoo Sled Company, Kalamazoo, Mich.
Manistee Novelty Company, Manistee, Mich.
New England Baby Carriage Company, Winchendon, Mass.
American Rattan Company, St. Louis, Mo.
Stowell Mfg. Company, Putney, Vt.
M. Redgrave, Jersey City, N. J.
Noble & Cooley, Granville, Mass.
Mason & Parker, Winchendon, Mass.
J. G. Hammond & Son, Frankfort, Philadelphia, Pa.
Kenton Hardware Mfg. Company, Kenton, Ohio.
Harris Toy Company, Toledo, Ohio.
Ideal Toy Company, Detroit, Mich.
Wilkins Toy Company, Keene, N. H.
J. & E. Stevens Company, Cromwell, Conn.
Wrightsville Hardware Company, Wrightsville, Pa.
Logan & Strobridge Iron Company, New Brighton, Pa.
Wm. Shimer, Son & Co., Freemansburg, Pa.
Grey Iron Casting Company, Mt. Joy, Pa.
Columbia Gray Iron Company, Columbia, Pa.
Dent Hardware Company, toy department, Fullerton, Pa.
Jones & Bixler Mfg. Company, Freemansburg, Pa.
Wing Mfg. Company, Chicago, Ill.
Arcade Mfg. Company, Freeport, Ill.
Gong Bell Mfg. Company, East Hampton, Conn.
N. N. Hill Brass Company, East Hampton, Conn.
Watrous Mfg. Company, East Hampton, Conn.
Fanner Mfg. Company, toy department, Cleveland, Ohio.
A. C. Williams, Ravenna, Ohio.

The following names constitute the executive staff, important standing committees and Board of Directors—viz.:

OFFICERS.

President, Nicholas H. Colwell, Pawtucket, R. I.
First vice-president, William E. Kidder, Kalamazoo, Mich.
Second vice-president, Adam C. Williams, Ravenna, Ohio.
Secretary, Charles W. West, Toledo, Ohio.
Assistant secretary, Dwight L. Mason, Winchendon, Mass.
Treasurer, Fred W. Crandall, Elkland, Pa.
General counsel, Frank F. Vander Veer, New York.

STANDING COMMITTEES.

Finance.

John E. Bleekman, chairman, 60 Broadway, New York.
M. G. Collins, York, Pa.
M. E. Converse, Winchendon, Mass.

Executive.

E. S. Coe, chairman, Cromwell, Conn.
R. B. Cooley, Granville, Mass.
A. Boeker, St. Louis, Mo.

DIRECTORS.

For the Iron Industry: F. P. Beedle, L. S. Bixler, T. B. Himes, F. H. Morgan, N. N. Hill, J. H. Logan, M. J. Shimer, M. G. Collins, E. S. Coe, A. C. Williams, F. H. Harris, T. J. Weakley.

For the Wood Industry: A. Boeker, A. O. Speare, M. Redgrave, F. A. Hall, A. A. Tisdale, B. W. Porter, R. B. Cooley, F. W. Crandall, W. E. Kidder, R. L. Whitehill, W. H. Hawes, J. E. Bleekman, W. H. Eastwood, M. E. Converse, N. H. Colwell.

HOLIDAY ANNOUNCEMENTS.

A Dainty Pamphlet.

THE BARRETT HARDWARE COMPANY, Joliet, Ill., have distributed an attractive illustrated pamphlet with tinted cover, entitled "Another Message from Santa Claus." On the back of the cover are these

"Quality is the Important Point."
ABOUT CHRISTMAS KNIVES
The "boy" isn't the only member of the family who would be pleased with a knife. Mother and Sister, as well as "Pa" would be proud to possess one of the fine pearl or stag handle "Barrett" Knives.
And the selection! Over three hundred styles for a choice.
Ladies' pearl handle knives, 25
Pearl and Stag handle knives, the
space we can't tell of all—but a few prices,
.50, .75, 1.00, 1.25, 1.50,
1.75 and up to $4.00.
"If its from Barrett's its a Bargain"

Fig. 1.—A Page from Santa Claus' Message.

words: "If It's from Barrett It's a Bargain." The reproduced page, reduced in size, shown in Fig. 1, indicates the style in which the pamphlet is gotten up. The printing and illustrations are in different colors. In addition to Cutlery, there are illustrations of Wagons, Sleds, Toy Wringers, Heaters, Skates, Carpet Sweepers, Food Choppers, Carvers and Wringing and Washing Machines. There are also two pages of suggestions, giving lists of

Fig. 2.—Cover of the Bassett Pamphlet.

articles suitable for presents. These are all goods which are regularly to be found in a Hardware store, but put in this form were calculated to help people out of the dilemma of what to buy. The accompanying letter from Santa Claus occupied the title page:

Joliet, December 15, 1902.

To My Friends:

Last year I allowed the Barrett Hardware Co. to induce me to make a few suggestions for

Christmas Shopping, now they are trying to make an annual event of it.

They seem to think, from my experience (over nineteen hundred years in the business), that I can give good advice.

But, bless your soul, there are so many new things coming out every year that "the old Saint himself" has to sit up o' nights the other three hundred and sixty-four days to keep posted.

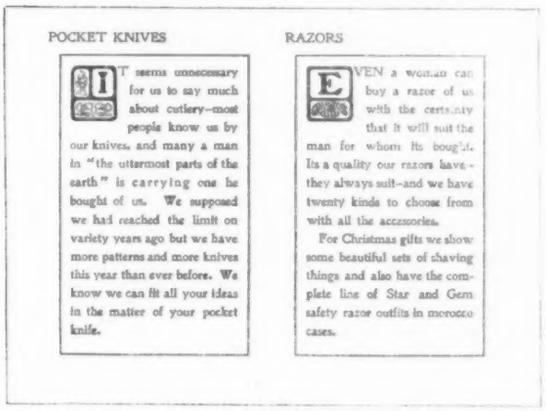
But here you are—suggestions "by Santa Claus" of the nice gifts in a hardware store.

Read every page carefully and you will be under obligations to

SANTA CLAUS.

Ye Old Hardware Store.

In Fig. 2 is reproduced the front cover of a pamphlet distributed by the John E. Bassett & Co., New Haven, Conn., whose establishment has long been known as "Ye Old Hardware Store," as the business was founded


POCKET KNIVES

IT seems unnecessary for us to say much about cutlery—most people know us by our knives, and many a man in "the uttermost parts of the earth" is carrying one he bought of us. We supposed we had reached the limit on variety years ago but we have more patterns and more knives this year than ever before. We know we can fit all your ideas in the matter of your pocket knife.

RAZORS

EVEN a woman can buy a razor of us with the certainty that it will suit the man for whom its bought. Its a quality our razors have—they always suit—and we have twenty kinds to choose from with all the accessories.

For Christmas gifts we show some beautiful sets of shaving things and also have the complete line of Star and Gem safety razor outfits in morocco cases.

Fig. 3.—A Page from the Bassett Pamphlet.

in 1784. The branching out mentioned on the cover, Fig. 2, refers to the recent addition of another four-story building to their former premises. The cover of the pamphlet was of dark paper, the leaves being of white paper, printed in colored ink. It was a trade stimulator, as will be seen from the reproduction of one of the pages, reduced in size, in Fig. 3. This gives an idea of the arrangement of pages, each of which had headings of two kinds of goods. Attention was thus called to Carving Knives, Table Cutlery, Scissors, Dog Collars, Skates, Sleds, Chafing Dishes, French Coffee Pots, Fire Bellows, Postal Scales, Pocket Flasks, Corkscrews, Thermometers, Fire Place Goods, Tool Chests and Cabinets, Food Choppers, Family Scales, &c. The pamphlet was accompanied by a small calendar pad, attached to an aluminum sheet, upon which was a picture of the company's store.

PITTSBURGH REPORT.

The following advices in regard to the Pittsburgh market were received too late for insertion in Notes on Prices:

Wire Nails.—We note a satisfactory condition of the Wire Nail market, the volume of business being fairly large and the tone of the market is firm. There is almost an entire absence of cutting, the leading mills adhering rigidly to prices, any unevenness existing being among the smaller mills. Specifications on contracts are coming in freely and the outlook for spring trade is very encouraging. We quote Wire Nails at $1.85 in carloads to jobbers, $1.90 in carloads to retailers and $2 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged, and for tinning Nails $1.50 per keg extra.

Cut Nails.—There is a demand for Cut Nails and prices are firm. There is still complaint about delayed shipments of Nails, due to congested condition of the railroads and also to some extent to scarcity of Steel. Iron Cut Nails continue scarce and bring the usual advances over steel. We quote Steel Cut Nails as follows: $2.05, base, in carloads, and $2.10 in less than carloads, plus freight in Tube Rate Book to point of destination, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Demand from the West is reported to be quite heavy, and shipments this month have been quite large, buyers desiring to get as much Wire in as possible before the advance in freights goes into effect on January 1. The tone of the market is firm, there being very little cutting, and this by the smaller mills. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days: Painted, $2.15; Galvanized, $2.45, in carload lots to jobbers; Painted, $2.20; Galvanized, $2.50, in carloads to retailers; Painted, $2.30; Galvanized, $2.60, in small lots to retailers.

Plain Wire.—A good deal of business is being placed, mostly by Western consumers, and shipments this month have been heavy. A large advance in freights goes into effect January 1. We quote Plain Wire, $1.75, base, for Nos. 6 to 9 in carloads to jobbers, $1.80 in carloads to retailers and $1.90 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

CALENDARS, &c.

AMERICAN STEAM GAUGE & VALVE MFG. COMPANY, Jamaica Plain, Mass.: Gauges, Valves and Thompson Improved Indicators.

STANDARD CASTER & WHEEL COMPANY, 318-326 East Twenty-third street, New York: "A Breath of Spring" is the title of the pictorial part of the calendar, which also calls attention to their line of Casters.

TACOMA STEAM BOILER WORKS, S. D. Brear & Son, Tacoma, Wash.: "The Lover's Return." The company manufacture Marine, Locomotive and Stationary Boilers.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

THE large retail establishment of Eastwood & Chase at Cedar Rapids, Iowa, was destroyed by fire several weeks since, the loss being $35,000. The building had been erected three years ago at a cost of $10,000. The firm will not resume business, but G. W. Davis, formerly a grocery traveling salesman for a Davenport concern, will soon open a store in Cedar Rapids, employing C. D. Chase as buyer and salesman until Mr. Davis becomes familiar with the Hardware business. Mr. Davis will be pleased to receive catalogues and price-lists relating to the general Hardware line.

Garry Vinson will open a new store at Waynesboro, Ga., on January 1. Catalogues and other printed matter pertaining to general Hardware will be appreciated.

Lee Richardson & Co., Vicksburg, Miss., will open a shop on January 1, and in connection will also build Delivery Wagons and cheap Buggies. They will be pleased to receive quotations on goods pertaining to this department.

CANTON HARDWARE COMPANY.

CANTON HARDWARE COMPANY, Canton, Ohio, have increased their capital stock from $75,000 to $200,000. There is practically no change in the concern, excepting that some of the older stockholders are retiring and some of the young men who have been connected with the company for a number of years have taken an interest in the business. During the past year the company have built an addition, 40 x 70 feet, and put another story on the building they have occupied for some time.

Sansom, Shultz & Campbell have been succeeded in the Hardware, Farm Implement, Buggy, Wagon and Harness business in Alvarado, Texas, by Shultz & Campbell, who continue at the old stand.

AMONG THE HARDWARE TRADE.

J. W. Gallihugh has succeeded Gallihugh & Son in the Hardware, Stove and Farm Implement business in Blairstown, Mo.

Murray & Kumler, Grass Creek, Ind., are about to dispose of their Hardware business to Thomas Bros.

H. A. Zimmerman, in the Hardware and Bicycle line in Davenport, Iowa, has disposed of an interest in the concern to N. J. Maw. The business has been incorporated with a capital of $25,000 under the style of H. A. Zimmerman & Co., and in addition to the present store they will open a general machinery exchange, the place of location not yet being decided on. This enterprise is a new one for Davenport, there being no machinrey exchange in the city at the present time. The new company will carry a general line of gasoline and steam machinery and boilers; also new and second-hand goods in this line. Mr. Zimmerman is a man of long experience in the Hardware line, having formerly for 14 years been located at Rock Island, and for the past six years in Davenport.

Howard & Brown, Hardware and Iron and Steel merchants, Ludlow, Vt., have purchased the Hardware stock and good will of T. F. McDonald, and will combine the two stocks in the McDonald store.

C. R. Fagan has bought George Gale's interest in the Hardware firm of Parzybok & Gale, Vinton, Iowa, and the style is now Parzybok & Fagan.

Blakkolb & Sons have succeeded Blakkolb Bros. in the Hardware, Stove, Tinware, Sporting Goods and general store business at Naper, Neb. The store has been enlarged from 18 x 24 feet to 24 x 65 feet.

Jackson-Clayton Hardware Company, Celina, Frisco and Prosper, Texas, have been incorporated with a capital stock of $25,000. They are successors to Jackson & Tidwell Company in the Hardware, Stove, Agricultural Implement, Vehicle and Harness business. The principal place of business is at Celina.

Clark & Voorhees, Hardware, Stoves, Tinware, Farm Implements, Sporting Goods, Buggies, Paints and Oils, &c., Elmwood, Neb., will be succeeded January 1 by F. C. Voorhees & Co. The business will be under the management of F. C. Voorhees, a member of the former firm, and will be continued in the new modern brick building, 40 x 75 feet, erected about a year ago.

Geo. M. Cooley, wholesale and retail dealer in Hardware, Stoves, Tinware, Iron and Steel, Agricultural Implements, Plumbing Supplies, Wagons, &c., San Bernardino, Cal., has lately taken possession of his new building. This structure has a frontage of 47 feet and a depth of 150 feet, with solid plate glass front. The salesroom is 47 x 110 feet, and is said to be one of the most up-to-date Hardware stores in the southern end of the State. In the rear are two rooms, one 27 x 40 feet, used as a shop and the other 20 x 40 feet, used as Iron and Oil room. In the rear of the building is a lot 33 x 300 feet, on which is a corrugated iron building 22 x 208 feet, with driveway, for accommodating heavy goods. In this building is a large power pipe machine for cutting and threading all sizes of standard Pipe and Casing. Mr. Cooley has been identified with the Hardware business in San Bernardino since September, 1875, and now employs about 20 men. During the past year he has manufactured a good many road oiling machines for applying crude oil to public roads.

F. O. Cronemiller has added a line of Hardware to his former Harness, blanket and robe business in Rock City, Ill.

G. O. Morris has sold his stock of Shelf Hardware, Tinware and Sporting Goods in New Boston, Texas, to B. M. Hughes.

E. Barglof & Co. have lately embarked in the Hardware and Agricultural Implement business in Greenville, Iowa.

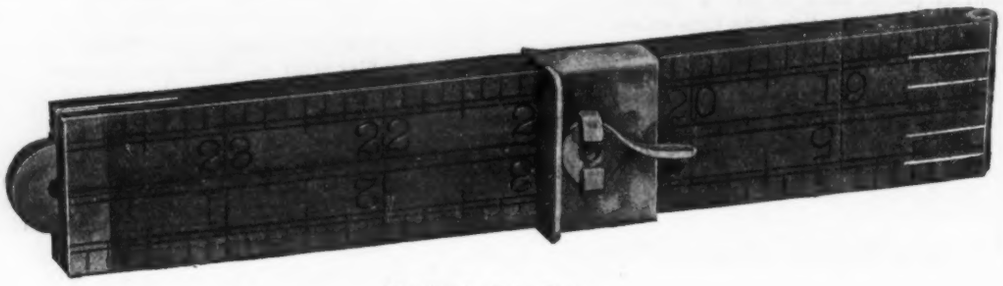
MISCELLANEOUS NOTE.

William E. Pratt Mfg. Company.

William E. Pratt Mfg. Company, 91 Lake street, Chicago, Ill., are large manufacturers of malleable iron castings and hardware specialties. In a new pamphlet catalogue, now ready for distribution, are shown a large line of hog rings and ringers, Hurd hog tamers, cattle dehorners, broom and tool hangers, wire mats, bill files, bird cage hooks, trouser hangers, husking pins, post augers, weaners and numerous other goods. Their works at Joliet, Ill., extend 800 feet along the Rock Island track, and a malleable iron plant, recently put up to enable them to get material promptly, also permits them to make to order for the trade various kinds of malleable iron parts.

The Handy Rule Gauge.

The Caldwell Mfg. Company, Rochester, N. Y., are offering the rule gauge shown herewith. It clamps on any standard 2-foot rule and can be adjusted or removed in an instant.



The Handy Rule Gauge.

Special Slim Taper File.

The McCaffrey File Company, Fifth and Berks streets, Philadelphia, Pa., are putting on the market the special slim taper file shown in the accompanying cut. This is referred to as having a thin edge and as being tempered so as not to break out on the corners. The company state that this is a new idea of theirs, which has been thoroughly tested before putting it on the market, so that they are in a position to fully guarantee their claim.

Special Slim Taper File.

The Standard Wrench Attachment.

Frank H. Czarniecki Company, 335 Fifth avenue, Pittsburgh, Pa., are offering the wrench attachment illustrated herewith. The attachment, applied to an ordinary wrench, is designed for use in any position that

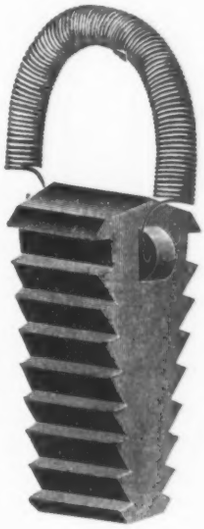


Fig. 1.—The Standard Wrench Attachment.

is required of a pipe wrench, including overhead work, side work or in cramped quarters. If the wrench is to be used for pulling toward the operator the attachment is placed against the upper jaw; if used for pushing from the operator the attachment is placed against the lower jaw. It is explained that the spring on the

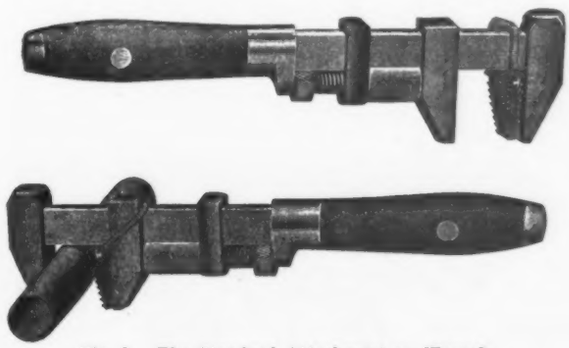
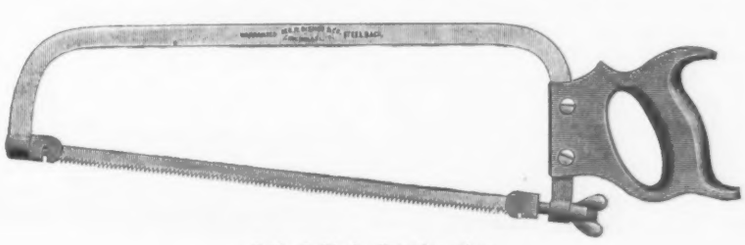


Fig. 2.—The Standard Attachment on Wrench.

attachment is merely to hold it in place on the wrench, that there is absolutely no strain on the spring, and that it will not wear out. The attachment, it is pointed out, is easily adjusted, has a sure grip and will not slip.

Swivel Blade Pruning Saw.

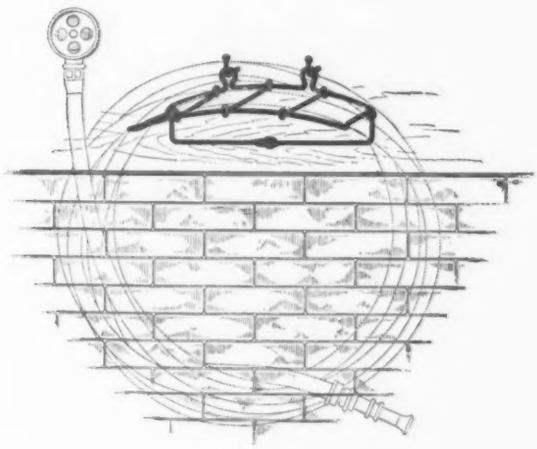
Geo. H. Bishop & Co., Cincinnati, Ohio, and Lawrenceburg, Ind., are offering the trade a new pruning saw, as illustrated herewith. This saw is made with a flat steel back. The blade acting on swivel ends enables the operator to place the cutting edge in any position that may be desired. The material used throughout is referred to as of the highest grade, the blade being set ready for immediate use. The saws are made in four sizes: 16, 18, 20 and 22 inches long.



Swivel Blade Pruning Saw.

The Champion Hose Rack.

The Boston Belting Company, Boston, Mass., New York office 100-102 Reade street, are offering the hose rack shown herewith. It is made entirely of heavy galvanized iron, simple in construction and strong. It is designed to keep the hose in good condition and out of the way, but always ready for immediate use. The rack may be attached, near the sill cock, to the house, in the



The Champion Hose Rack.

stable or cellar, or wherever most convenient to keep the hose, which is coiled and hung on the rack.

The Bishop Cabinet Scraper.

The cabinet scraper holder, illustrated herewith, is alluded to as an inexpensive, yet substantial holder, by which a more desirable slant is given to the scraper. Each holder is supplied with a bevel edge scraper of 16 gauge steel 3 x 3 inches in size. It is explained that

The Bishop Cabinet Scraper and Holder No. 2.

any style or size of scraper can be firmly held with the holder. The scraper and holder are offered by Geo. H. Bishop & Co., Cincinnati, Ohio, and Lawrenceburg, Ind.

Montesano Hardware Company, Montesano, Wash., who succeeded to the business of J. W. Carothers in July last, have materially increased the capacity of the establishment, and are now carrying a considerably larger stock than heretofore. H. B. Marcy, the proprietor, has also decided on a further addition, to be commenced at once, and intends taking up the sale of Heavy Hardware later.

Slingsby's Patent Trucks.

H. B. Slingsby, 253 Broadway, New York, is the manufacturer of a very comprehensive line of trucks for stores, warehouses, railroad and steamboat use, &c., the working principles of which are shown in the accompanying cuts. Fig. 1 illustrates a bottom view and is typical of all of them, the variations being in the upper construction, adapting the trucks to a multiplicity of

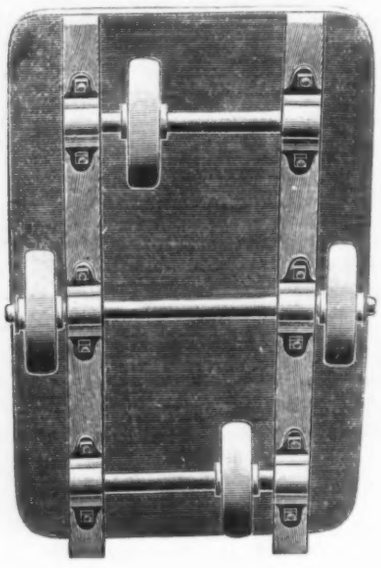


Fig. 1.—Bottom View of Quick Turning Truck.

uses. The cardinal feature of this style of truck is the freedom with which it can be instantly and easily turned in any direction, the truck turning in almost its own length. This is accomplished by having the end wheels free, sliding on the fore and aft axles, the two side center wheels remaining in the fixed position shown in the cuts. This underbody principle is applied to trucks

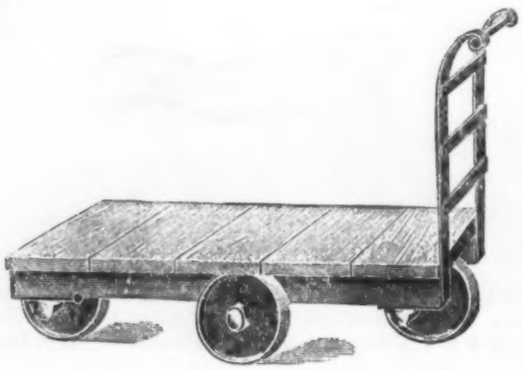


Fig. 2.—Warehouse or Store Truck.

with and without end or side pieces, for carrying almost any commodity, as shown in a catalogue of 116 pages, which will be sent to those interested. Some of the trucks have oak platforms, while others are constructed entirely of iron, while still others are entirely inclosed on six sides.

Callahan & Douglas, Binghamton, N. Y., have bought the three-story brick block in which their Hardware business is located. Their business has increased until now they occupy the three floors and basement of the block, with the exception of the front part of the second floor. They expect in time to occupy the entire building, and hope eventually to rebuild and erect a handsome modern structure on the site.

Fred. Opocensky has sold his Hardware business in Lynch, Neb., to Jos. Micanek & Sons.

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